

SERVICE MANUAL

BA-5 CHASSIS

Self Diagnosis
Supported model

MODEL

COMMANDER

DEST

CHASSIS NO.

KV-29FS12K

RM-Y149A

KOREA

SCC-S53A-A



KV-29FS12K



RM-Y149A

TRINITRON® COLOR TV
SONY®

SPECIFICATIONS

		KV-29FS12K
Power requirements		120V-220V, 60Hz/50Hz
Number of inputs/outputs		
	Video ¹⁾	3
	S Video ²⁾	1
	Audio ³⁾	3
	Audio Out ⁴⁾	1
	Y, P _B , P _R ⁵⁾	1
Speaker output(W)		5Wx2
Power Consumption(W)		
	In use(Max)	185W
	In standby	1W
Dimensions(W/H/D)		
	(mm)	700 x 632 x 512 mm.
	(in)	27 ^{1/2} x 24 ^{7/8} x 20 ^{1/6} in.
Mass		
	(kg)	47kg
	(lbs)	103 lbs. 10 oz.

- 1) 1 Vp-p 75 ohms unbalanced, sync negative
- 2) Y: 1 Vp-p 75 ohms unbalanced, sync negative
C: 0.286 Vp-p (Burst signal), 75 ohms
- 3) 500mVrms (100% modulation), impedance: 47kilohms
- 4) More than 408 mVrms at the maximum volume setting (variable)
More than 408 mVrms (fix)
- 5) Y: 1.0 Vp-p, 75 ohms, sync negative; PB: 0.7 Vp-p, 75 ohms;
PR: Vp-p, 75 ohms

Television system

American TV Standard/NTSC

Channel coverage

VHF:2-13/UHF:14-69/CATV:1-125

Visible screen size

27" picture measured diagonally

Actual screen size

29" picture measured diagonally

Antenna

75 ohm external antenna terminal for VHF/UHF

Supplied accessories

Remote Commander RM-Y149A
Size AA (R6) batteries (2)

Optional accessories

Connecting cables: VMC-810S/820S, VMC-720M,
YC-15V/30V, RK74A
U/V mixer EAC-66

Design and specifications are subject to change without notice.

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
	Warnings and Cautions	4
	Self-Diagnostic Function	4
	Safety Check-Out Instructions	7
1.	DISASSEMBLY	
1-1.	Rear Cover Removal	8
1-2.	Chassis Assembly Removal	8
1-3.	Service Position	8
1-4.	Picture Tube Removal	9
2.	SET-UP ADJUSTMENTS	
2-1.	Beam Landing	10
2-2.	Convergence	11
2-3.	Focus	12
2-4.	Screen (G2)	13
2-5.	Method of Setting the Service Adjustment Mode	13
2-6.	White Balance Adjustments	13
3.	SAFETY RELATED ADJUSTMENTS	
3-1.	☒ R564 Confirmation Method (HV Hold-Down Confirmation) and Readjustments	14
3-2.	B+ Voltage Confirmation and Adjustment	14
4.	CIRCUIT ADJUSTMENTS	
4-1.	Setting the Service Adjustment Mode	16
4-2.	Memory Write Confirmation Method	16
4-3.	Adjustment Buttons and Indicators	16
4-4.	MA Board Adjustments	20
5.	DIAGRAMS	
5-1.	Block Diagram	22
5-2.	Circuit Board Location	28
5-3.	Printed Wiring Boards and Schematic Diagrams	28
	• A Board	29
	• MA Board	36
	• HX Board	40
	• CA Board	42
	• HZ Board	43
	• K Board	44
	• VA Board	45
	• D Board	46
5-4.	Semiconductors	48
6.	EXPLODED VIEW	
6-1.	Chassis	49
7.	ELECTRICAL PARTS LIST	50

WARNINGS AND CAUTIONS

CAUTION

SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR CARBON PAINTED ON THE CRT, AFTER REMOVING THE ANODE.

WARNING!!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS. THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS, AND IN THE PARTS LIST ARE CRITICAL FOR SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL FOR SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

ATTENTION!!

APRES AVOIR DECONNECTE LE CAP DE L'ANODE, COURT-CIRCUITER L'ANODE DU TUBE CATHODIQUE ET CELUI DE L'ANODE DU CAP AU CHASSIS METALLIQUE DE L'APPAREIL, OU AU COUCHE DE CARBONE PEINTE SUR LE TUBE CATHODIQUE OU AU BLINDAGE DU TUBE CATHODIQUE.

ATTENTION!!

AFIN D'EVITER TOUT RESQUE D'ELECTROCUTION PROVENANT D'UN CHÂSSIS SOUS TENSION, UN TRANSFORMATEUR D'ISOLEMENT DOIT ETRE UTILISÉ LORS DE TOUT DÉPANNAGE. LE CHÂSSIS DE CE RÉCEPTEUR EST DIRECTEMENT RACCORDÉ À L'ALIMENTATION SECTEUR.

ATTENTION AUX COMPOSANTS RELATIFS A LA SECURITE!!

LES COMPOSANTS IDENTIFIES PAR UNE TRAME ET PAR UNE MARQUE  SUR LES SCHEMAS DE PRINCIPE, LES VUES EXPLOSEES ET LES LISTES DE PIECES SONT D'UNE IMPORTANCE CRITIQUE POUR LA SECURITE DU FONCTIONNEMENT. NE LES REMPLACER QUE PAR DES COMPOSANTS SONY DONT LE NUMERO DE PIECE EST INDIQUE DANS LE PRESENT MANUEL OU DANS DES SUPPLEMENTS PUBLIES PAR SONY. LES REGLAGES DE CIRCUIT DONT L'IMPORTANCE EST CRITIQUE POUR LA SECURITE DU FONCTIONNEMENT SONT IDENTIFIES DANS LE PRESENT MANUEL. SUIVRE CES PROCEDURES LORS DE CHAQUE REMPLACEMENT DE COMPOSANTS CRITIQUES, OU LORSQU'UN MAUVAIS FONCTIONNEMENT SUSPECTE.

SELF-DIAGNOSTIC FUNCTION

The units in this manual contain a self-diagnostic function. If an error occurs, the STANDBY/TIMER LED will automatically begin to flash. The number of times the LED flashes translates to a probable source of the problem. A definition of the STANDBY/TIMER LED flash indicators is listed in the instruction manual for the user's knowledge and reference. If an error symptom cannot be reproduced, the Remote Commander can be used to review the failure occurrence data stored in memory to reveal past problems and how often these problems occur.

Diagnostic Test Indicators

When an error occurs, the STANDBY/TIMER LED will flash a set number of times to indicate the possible cause of the problem. If there is more than one error, the LED will identify the first of the problem areas.

Results for all of the following diagnostic items are displayed on screen. No error has occurred if the screen displays a "0".

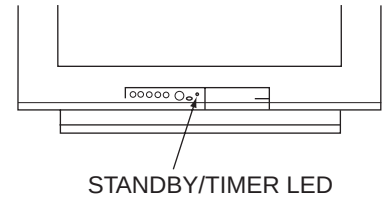
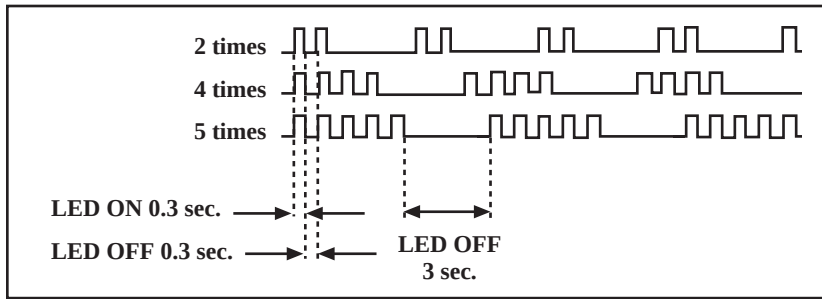
Diagnostic Item Description	No. of Times STANDBY/TIMER LED Flashes	Self-Diagnostic Display/ Diagnostic Result	Probable Cause Location	Detected Symptoms
Power does not turn on	Does not light	—	- Power cord is not plugged in. - Fuse is burned out. (F601) (A Board)	- Power does not come on. - No power is supplied to the TV. - AC power supply is faulty.
+B overcurrent (OCP)*	2 times	2:0 or 2:1	- H.OUT (Q502) is shorted. (A Board) - IC702 is shorted. (CA Board)	- Power does not come on. - Load on power line is shorted.
I-Prot	4 times	4:0 or 4:1	+13V is not supplied. (A Board) - IC502 is faulty. (A Board)	- Has entered standby state after horizontal raster. - Vertical deflection pulse is stopped. - Power line is shorted or power supply is stopped.
IK	5 times	5:0 or 5:1	- Video OUT (IC502) is faulty. (A Board) - IC301 is faulty. (MA Board) - Screen (G2) is improperly adjusted.**	- No raster is generated. - CRT cathode current detection reference pulse output is small.

* If a +B overcurrent is detected, stoppage of the vertical deflection is detected simultaneously.

The symptom that is diagnosed first by the microcontroller is displayed on the screen.

** Refer to Screen (G2) Adjustments in Section 3-4 of this manual.

Display of Standby/Timer LED Flash Count



<u>Diagnostic Item</u>	<u>Flash Count*</u>
+B overcurrent	2 times
I-Prot	4 times
IK	5 times

*One flash count is not used for self-diagnostic.

Stopping the Standby/Timer LED Flash

Turn off the power switch on the TV main unit or unplug the power cord from the outlet to stop the STANDBY/TIMER LAMP from flashing.

Self-Diagnostic Screen Display

For errors with symptoms such as “power sometimes shuts off” or “screen sometimes goes out” that cannot be confirmed, it is possible to bring up past occurrences of failure on the screen for confirmation.

To Bring Up Screen Test

In standby mode, press buttons on the Remote Commander sequentially, in rapid succession, as shown below:

Display → Channel [5] → Sound volume [−] → Power ON



Note that this differs from entering the service mode (sound volume [+]).

Self-Diagnostic Screen Display

SELF DIAGNOSTIC	
2: 000	← Numeral “0” means that no fault was detected.
3: N/A	
4: 000	
5: 001	← Numeral “1” means a fault was detected one time only.
101: N/A	

Handling of Self-Diagnostic Screen Display

Since the diagnostic results displayed on the screen are not automatically cleared, always check the self-diagnostic screen during repairs. When you have completed the repairs, clear the result display to “0”.

Unless the result display is cleared to “0”, the self-diagnostic function will not be able to detect subsequent faults after completion of the repairs.

Clearing the Result Display

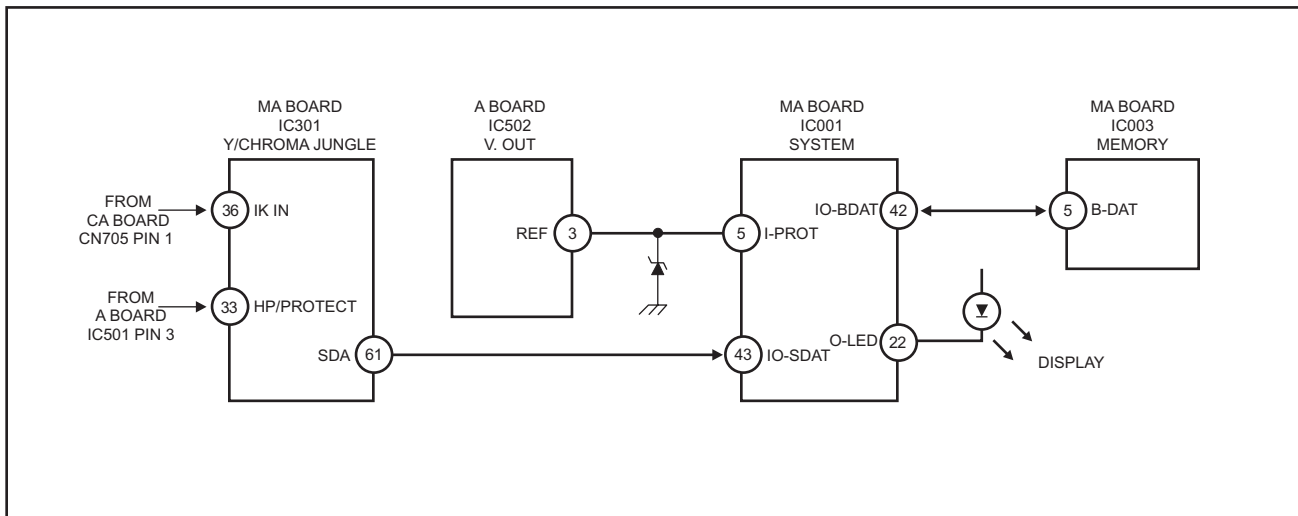
To clear the result display to “0”, press buttons on the Remote Commander sequentially when the diagnostic screen is displayed, as shown below:

Channel **8** → **ENTER**

Quitting the Self-Diagnostic Screen

To quit the entire self-diagnostic screen, turn off the power switch on the Remote Commander or the main unit.

Self-Diagnostic Circuit



+B overcurrent (OCP)

Occurs when an overcurrent on the +B (135V) line is detected by pin 33 of IC301 (MA Board). If the voltage of pin 33 of IC301 (MA Board) is less than 1V when V.SYNC is more than seven verticals in a period, the unit will automatically turn off.

I-Prot

Occurs when an absence of the vertical deflection pulse is detected by pin 5 of IC001 (MA Board). Power supply will shut down when waveform interval exceeds 2 seconds.

IK

If the RGB levels* do not balance within 2 seconds after the power is turned on, this error will be detected by IC301 (MA Board). TV will stay on, but there will be no picture.

*(Refers to the RGB levels of the AKB detection Ref pulse that detects 1K).

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or touching high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cords for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the B+ and HV to see if they are specified values. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
8. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

Leakage Test

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instructions.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low voltage scale. The Simpson's 250 and Sanwa SH-63TRD are examples of passive VOMs that are suitable. Nearly all battery-operated digital multimeters that have a 2 VAC range are suitable (see Figure A).

How to Find a Good Earth Ground

A cold-water pipe is a guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60- to 100-watt trouble- light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side on the line; the lamp should light at normal brilliance if the screw is at ground potential (see Figure B).

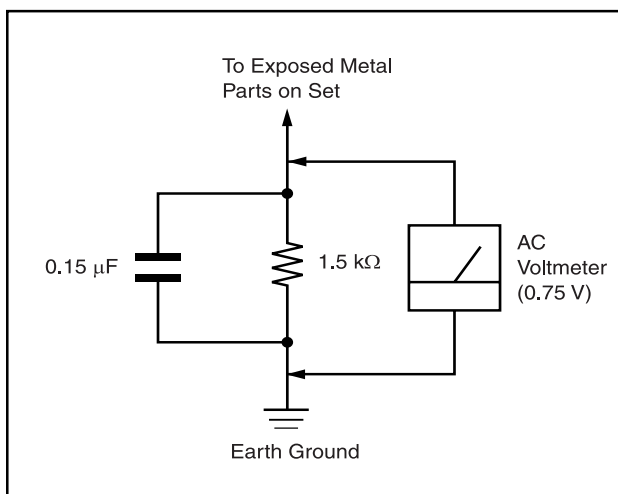


Figure A. Using an AC voltmeter to check AC leakage.

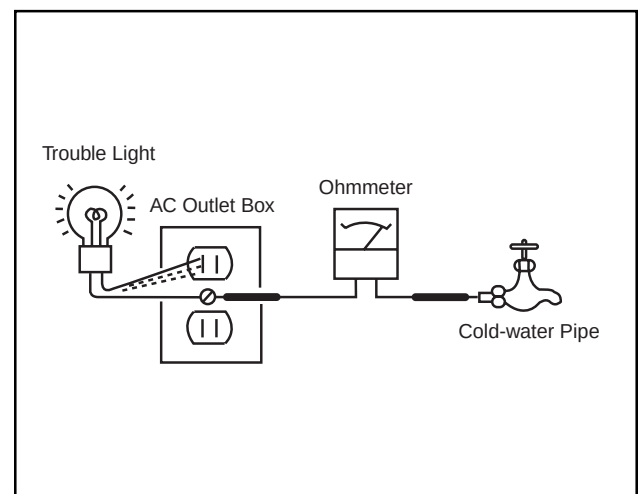
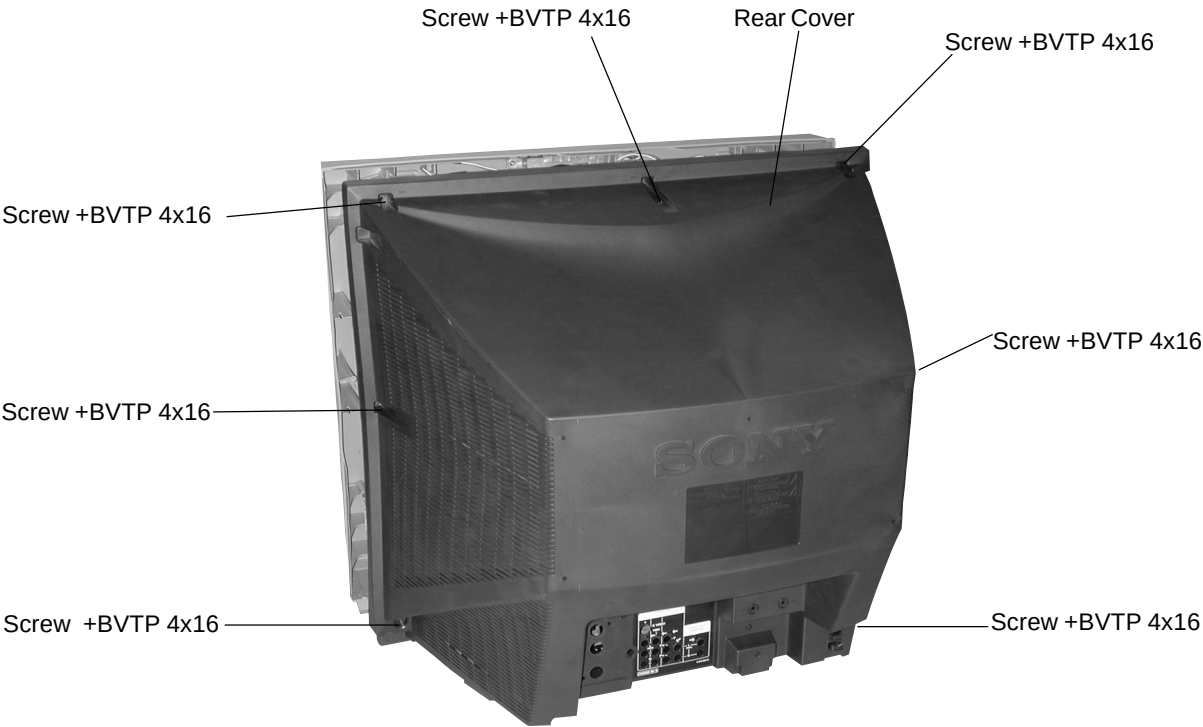


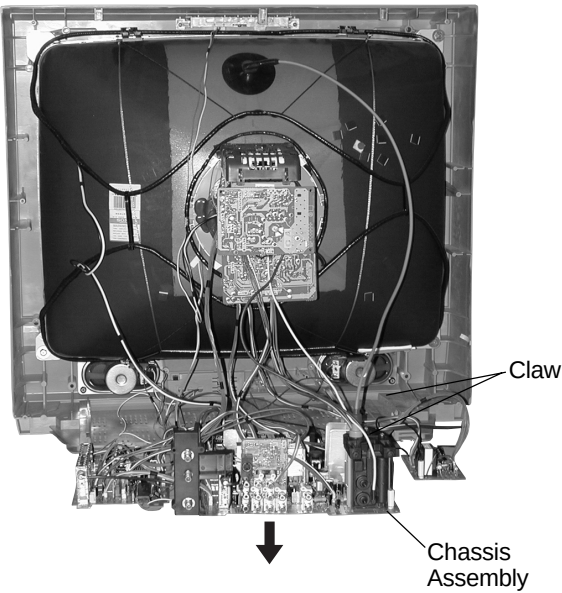
Figure B. Checking for earth ground.

**SECTION 1
DISASSEMBLY**

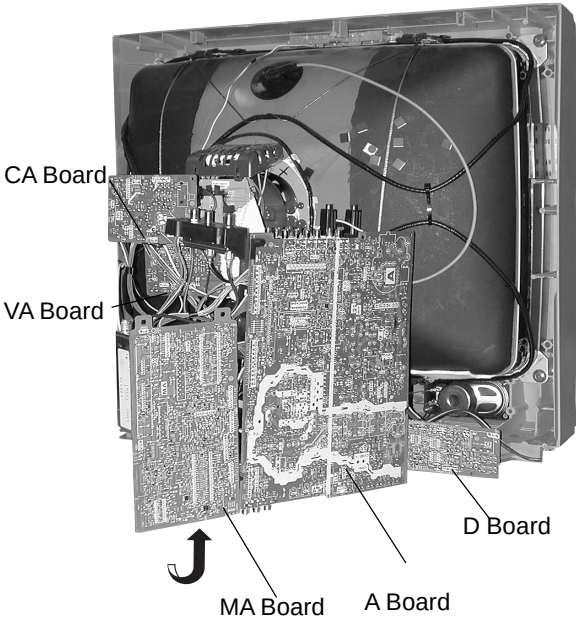
1-1. REAR COVER REMOVAL



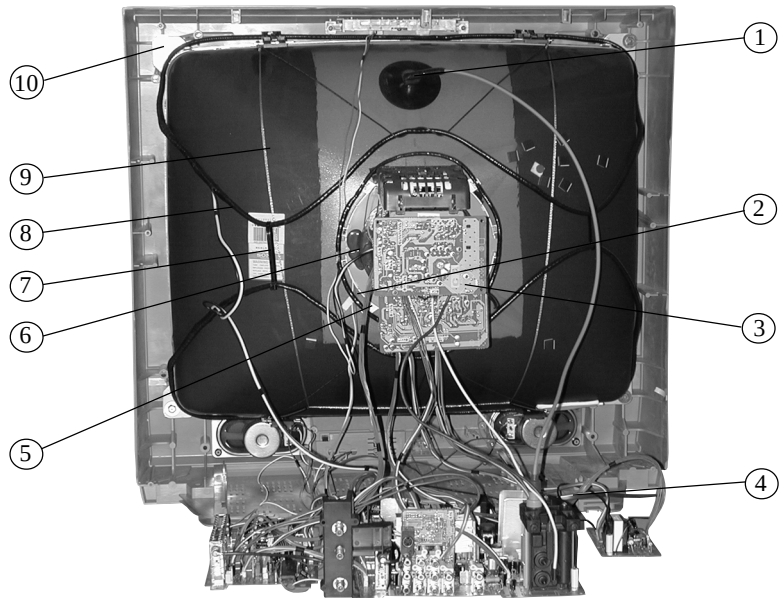
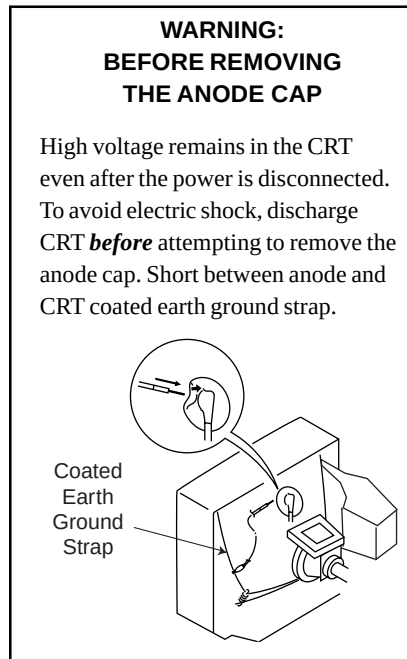
1-2. CHASSIS ASSEMBLY REMOVAL



1-3. SERVICE POSITION



1-4. PICTURE TUBE REMOVAL



1. Discharge the anode of the CRT and remove the anode cap.
2. Unplug all interconnecting leads from the deflection yoke, neck assembly, degaussing coils and CRT grounding strap.
3. Remove the CA Board from the CRT.
4. Remove the chassis assembly.
5. Loosen the neck assembly fixing screw and remove.
6. Loosen the deflection yoke fixing screw and remove.
7. Place the set with the CRT face down on a cushion and remove the degaussing coil holders.
8. Remove the degaussing coils.
9. Remove the CRT grounding strap and spring tensioners.
10. Unscrew the four CRT fixing screws [located on each CRT corner] and remove the CRT [Take care not to handle the CRT by the neck].

ANODE CAP REMOVAL

WARNING: High voltage remains in the CRT even after the power is disconnected. To avoid electrical shock, discharge the CRT **before** attempting to remove the anode cap. Short between anode and coated earth ground strap of CRT.

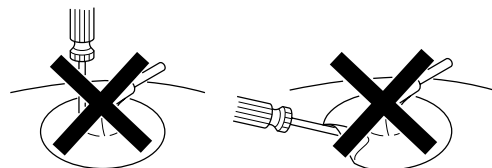
NOTE: After removing the anode, short circuit the anode of the picture tube and the anode cap to either the metal chassis, CRT shield, or carbon painted on the CRT.

REMOVAL PROCEDURES

-
-
-
- ① Turn up one side of the rubber cap in the direction indicated by arrow (a).
- ② Use your thumb to pull the rubber cap firmly in the direction indicated by arrow (b).
- ③ When one side of the rubber cap separates from the anode button, the anode cap can be removed by turning the rubber cap and pulling it in the direction of arrow (c).

HOW TO HANDLE AN ANODE CAP

- ① Do not use sharp objects which may cause damage to the surface of the anode cap.
- ② To avoid damaging the anode cap, do not squeeze the rubber covering too hard. A material fitting called a shatter-hook terminal is built into the rubber.
- ③ Do not force turn the foot of the rubber cover. This may cause the shatter-hook terminal to protrude and damage the rubber.



SECTION 2

SET-UP ADJUSTMENTS

The following adjustments should be made when a complete realignment is required or when a new picture tube is installed.

These adjustments should be performed with rated power supply voltage unless otherwise noted.

Set the controls as follows unless otherwise noted:

VIDEO MODE: STANDARD

PICTURE control: Normal

BRIGHTNESS control: Normal

Perform the adjustments in order as follows:

1. Beam Landing
2. Convergence
3. Focus
4. Screen (G2)
5. White Balance

Note: Test equipment required:

- Color Bar Pattern Generator
- Degausser
- DC Power Supply
- Digital Multimeter

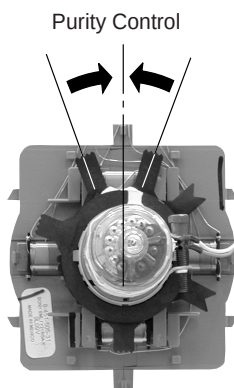
2-1. BEAM LANDING

Before beginning adjustment procedure:

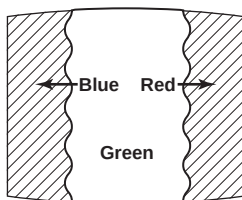
1. Degauss the entire screen.
2. Feed in the white pattern signal.

Adjustment Procedure

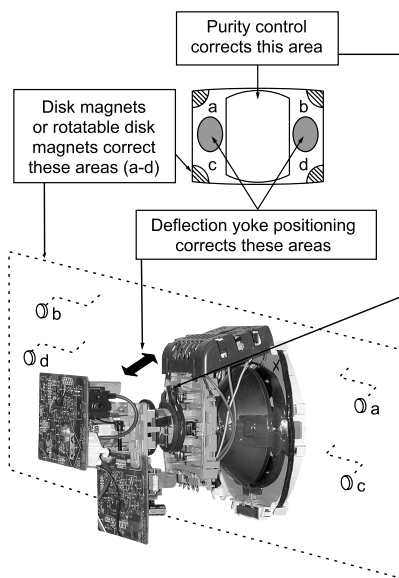
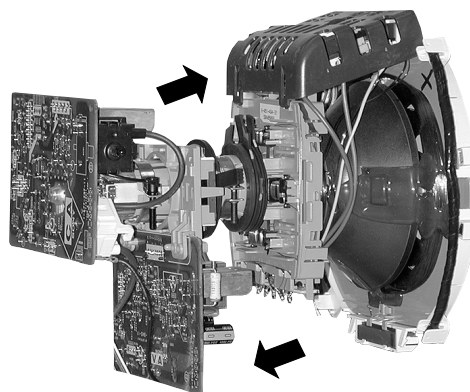
1. Input a raster signal with the pattern generator.
2. Loosen the deflection yoke mounting screw and set the purity control to the center as shown below.



3. Turn the raster signal of the pattern generator to green.
4. Move the deflection yoke backward and adjust the purity control so that green is in the center and red and blue are at the sides evenly.



5. Move the deflection yoke forward and adjust so that the entire screen becomes green.
6. Switch over the raster signal to red and blue and confirm the condition.
7. When the position of the deflection yoke is determined, tighten it with the deflection yoke mounting screw.
8. If landing at the corner is not right, adjust by using the disk magnets.



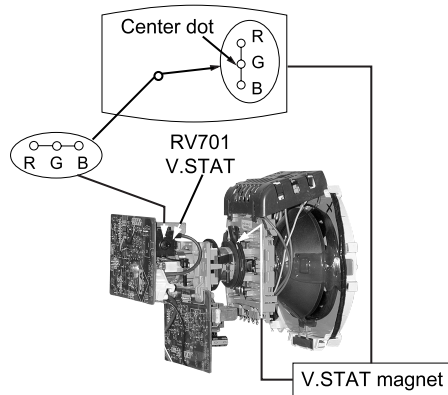
2-2. CONVERGENCE

Before starting convergence adjustments:

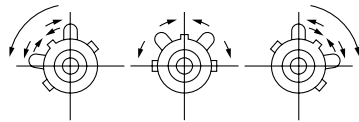
1. Perform FOCUS, V.LIN AND V.SIZE adjustments.
2. Set BRIGHTNESS control to minimum.
3. Feed in dot pattern.

Vertical Static Convergence

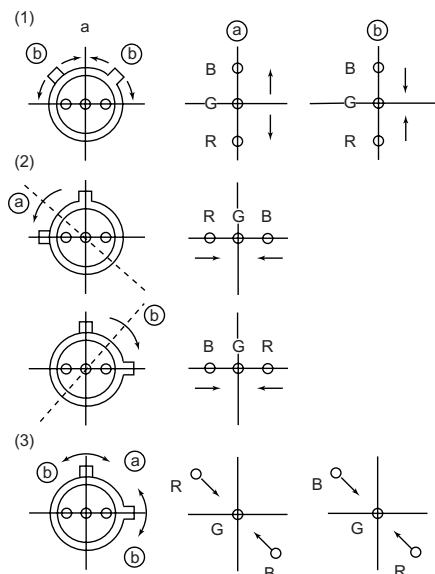
1. Adjust V.STAT magnet to converge red, green and blue dots in the center of the screen (Vertical movement adjust V.STAT RV701 to converge).



2. Tilt the V.STAT magnet and adjust static convergence to open or close the V.STAT magnet.



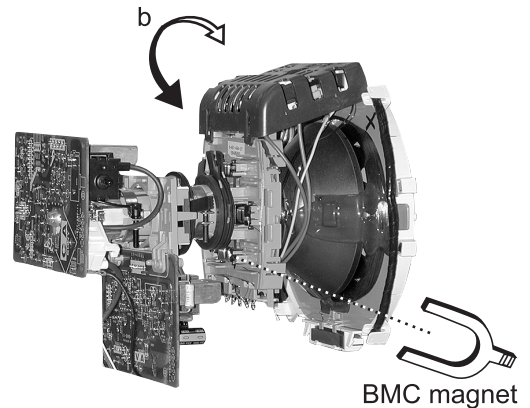
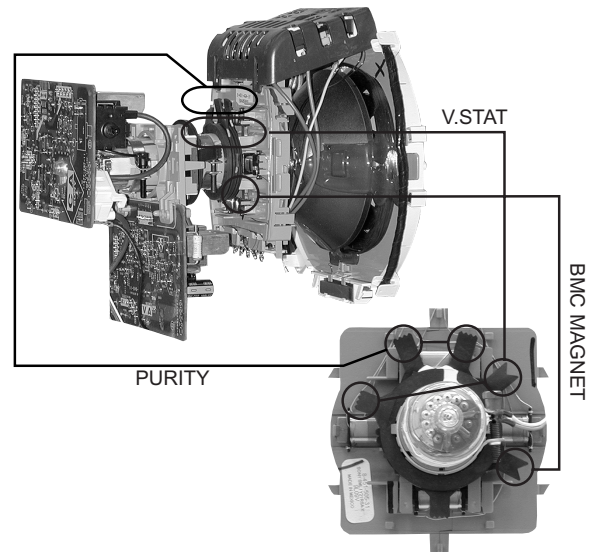
When the V.STAT magnet is moved in the direction of arrows a and b, red, green, and blue dots move as shown below:



Horizontal Static Convergence

If the blue dot does not converge with the red and green dots, perform the following:

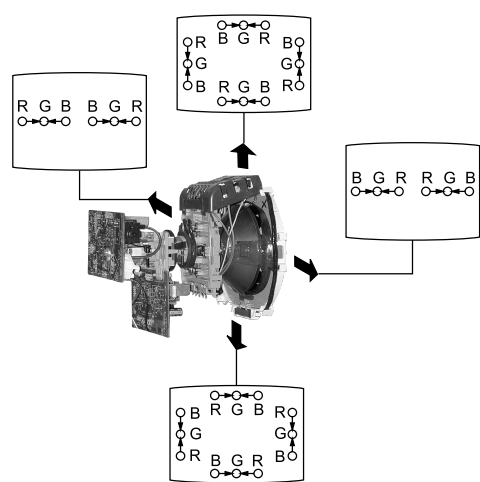
1. Move BMC magnet (a) to correct insufficient H. Static convergence.
2. Rotate BMC magnet (b) to correct insufficient V. Static convergence.
3. After adjusting the BMC magnet, repeat Beam Landing Adjustment.



Dynamic Convergence Adjustment

Before performing this adjustment, perform Horizontal and Vertical Static Convergence Adjustment.

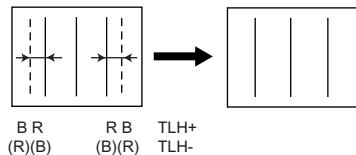
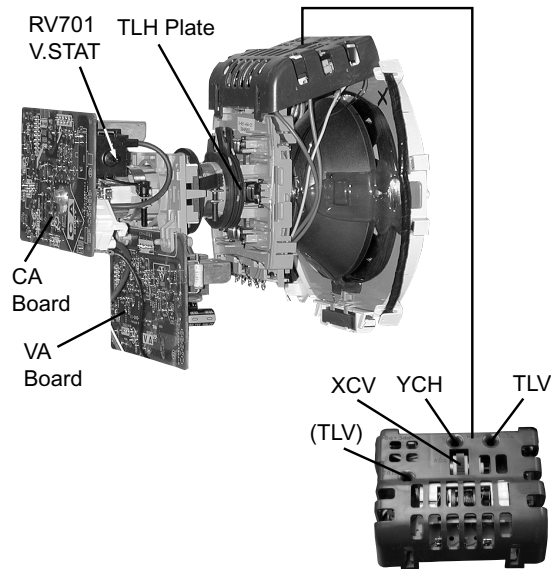
1. Slightly loosen deflection yoke screw.
2. Remove deflection yoke spacers.
3. Move the deflection yoke for best convergence as shown on the following page.



- 4. Tighten the deflection yoke screw.
- 5. Install the deflection yoke spacers.

TLH Plate Adjustment

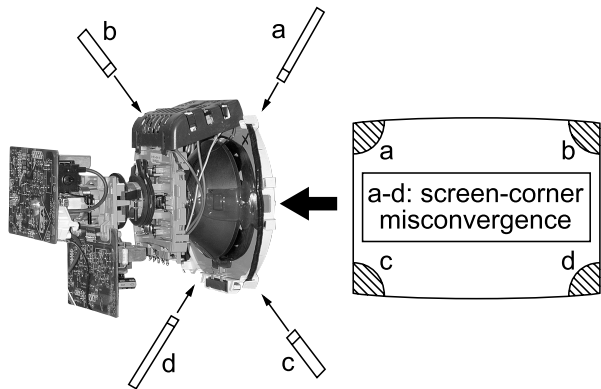
- 1. Input crosshatch pattern.
- 2. Adjust PICTURE QUALITY to standard, PICTURE and BRIGHTNESS to 50%, and OTHER to standard.
- 3. Adjust the Horizontal Convergence of red and blue dots by tilting the TLH plate on the deflection yoke.



- 4. Adjust XCV core to balance X axis.
 - 5. Adjust YCH VR to balance Y axis.
 - 6. Adjust vertical red and blue convergence with V.TILT (TLV VR).
- Note: Perform adjustments 3-6 while tracking items 1 and 2.

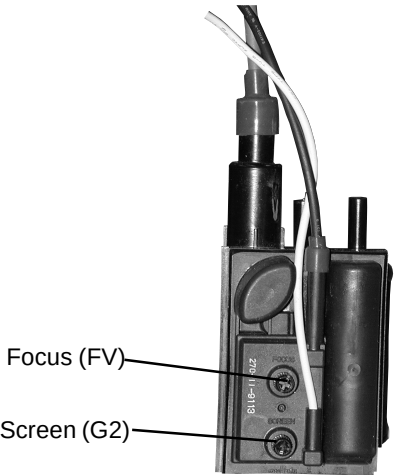
Screen-Corner Convergence

- 1. Affix a permalloy assembly corresponding to the misconverged areas.



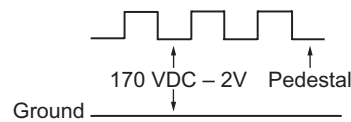
2-3. FOCUS

- 1. Adjust FOCUS control for best picture.



2-4. SCREEN (G2)

1. Input a dots pattern.
2. Set the PICTURE and BRIGHTNESS controls at minimum and COLOR control at normal.
3. Adjust SBRT, GCUT, BCUT in service mode with an oscilloscope as shown below so that voltages on the red, green, and blue cathodes are $170 \text{ VDC} \pm 2 \text{V}$.



4. Observe the screen and adjust SCREEN (G2) VR in FBT to obtain the faintly visible background of dot signal.

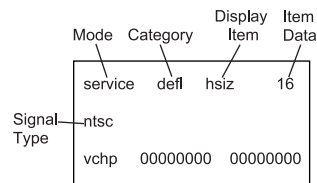
2-5. METHOD OF SETTING THE SERVICE ADJUSTMENT MODE

Service Mode Procedure

1. Standby mode (power off).
2. Press **[Display]** → Channel **[5]** → Sound volume **[+]** → Power on the Remote Commander (press each button within a second).

Service Adjustment Mode In

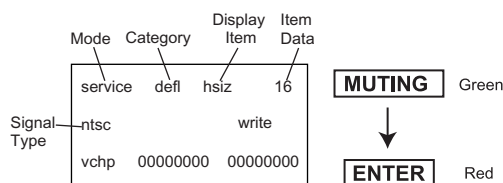
1. The CRT displays the item being adjusted.



2. Press **[1]** or **[4]** on the Remote Commander to select the item.
3. Press **[3]** or **[6]** on the Remote Commander to change the data.
4. Press **[MUTING]** then **[ENTER]** to save into the memory.

Service Adjustment Mode Memory

Turn set off then on to exit Service Adjustment Mode.



2-6. WHITE BALANCE ADJUSTMENTS

1. Input an entire white signal with burst.
2. Set to Service Adjustment Mode.
3. Set the PICTURE and BRIGHTNESS to minimum.
4. Adjust with SBRT if necessary.
5. Select GCUT and BCUT with **[1]** and **[4]**.
6. Adjust with **[3]** and **[6]** for the best white balance.
7. Set PICTURE and BRIGHTNESS to maximum.
8. Select GDRV and BDRV with **[1]** and **[4]**.
9. Adjust with **[3]** and **[6]** for the best white balance.
10. To write into memory, press **[MUTING]** then **[ENTER]**.

SECTION 3
SAFETY RELATED ADJUSTMENTS

3-1. R564 CONFIRMATION METHOD
(HV HOLD-DOWN CONFIRMATION) AND
READJUSTMENTS

The following adjustments should always be performed when replacing the following components which are marked with  on the schematic diagram:

Part Replaced ()	Adjustment ()
DY, T505, CRT, IC501, C507, C520, C505, C509, C515, T504, T503, C551, L510, C546, C537, C547, D517, D518, D519, R560, R561, R562, R563, R565, R566, R567, R525 A Board	HV HOLD-DOWN R564
IC301 MA Board	

Preparation Before Confirmation

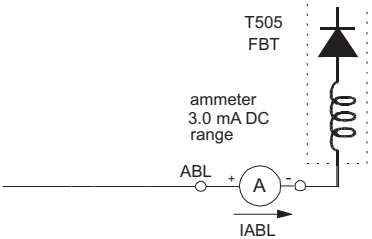
- 1. Using a Variac, apply AC input voltage: 120 ± 2 VAC.
- 2. Turn the POWER switch ON.
- 3. Input a white signal and set the PICTURE and BRIGHTNESS controls to maximum.
- 4. Confirm that the voltage between C546 (+) or TP503 and ground is more than 21.0 VDC.

Hold-Down Operation Confirmation

- 1. Connect the current meter between Pin 11 of the FBT (T505) and the PWB land where Pin 11 would normally attach. (See Figure 1 on the next page.)
- 2. Input a dot signal and set PICTURE and BRIGHTNESS to minimum: IABL = 1730 ± 100 µA.
- 3. Confirm the voltage of A Board TP-600 is 135 ± 1.5 VDC.
- 4. Connect the digital voltmeter and the DC power supply via diode 1SS119 to C546 (+) and ground. (See Figure 1 on the next page.)
- 5. Increase the DC power voltage gradually until the picture blanks out.
- 6. Turn DC power source off immediately.
- 7. Read the digital voltmeter indication (standard < 24.78+0,-0.1 VDC).
- 8. Input a white signal and set PICTURE and BRIGHTNESS to maximum: IABL = 1730 ± 100 µA.
- 9. Repeat Steps 4 to 7.

Hold-Down Readjustment

If the setting indicated in Step 2 of Hold-Down Operation Confirmation cannot be met, readjustment should be performed by altering the resistance value of R564 component marked with .



3-2. B+ VOLTAGE CONFIRMATION AND
ADJUSTMENT

Note: The following adjustments should always be performed when replacing the following components, which are marked with  on the schematic diagram on the A Board.

A BOARD: IC601, PH601

- 1. Using a Variac, apply AC input voltage: 130 + 2.0, -0.0 VAC.
- 2. Input a dot signal.
- 3. Set the PICTURE and BRIGHTNESS controls to minimum.
- 4. Confirm that the voltage of A Board TP-600 is <136.5 VDC.
- 5. If Step 3 is not satisfied, replace the components listed above, then repeat Steps 1–3.

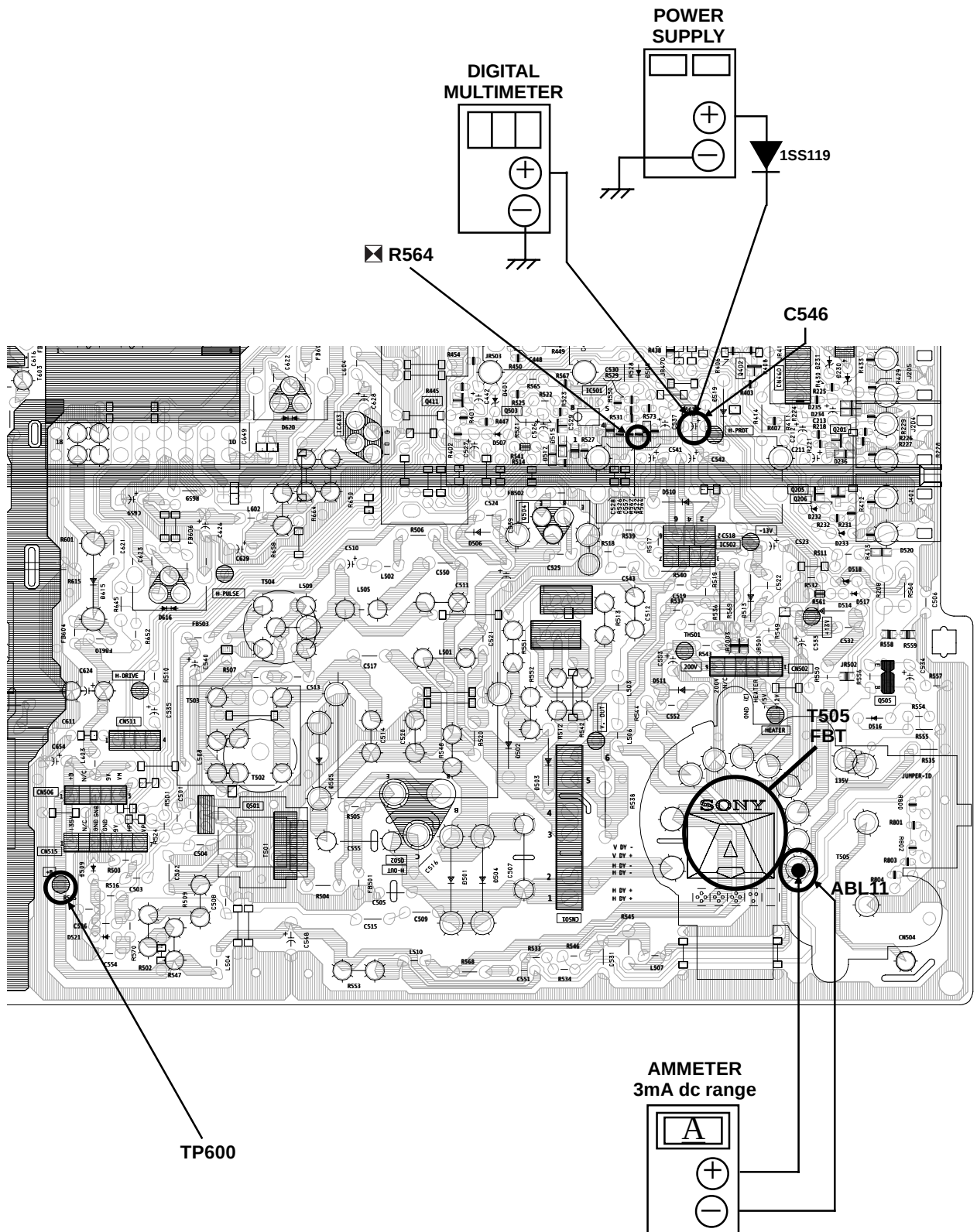


Figure 1

SECTION 4 CIRCUIT ADJUSTMENTS

ELECTRICAL ADJUSTMENTS BY REMOTE COMMANDER

Use the Remote Commander (RM-Y149A) to perform the circuit adjustments in this section.

NOTE: Test Equipment Required:

- Pattern generator
- Frequency counter
- Digital multimeter
- Audio oscillator

4-1. SETTING THE SERVICE ADJUSTMENT MODE

- Standby mode (power off).
- Press **Display** → Channel **5** → Sound volume **+** → Power on the Remote Commander (press each button within a second).

Service Adjustment Mode On

- The CRT displays the item being adjusted.

	Mode	Category	Display Item	Item Data
Signal Type	service	defl	hsiz	16
	ntsc			
	vchp	00000000	00000000	

- Press **1** or **4** on the Remote Commander to select an item.
- Press **3** or **6** on the Remote Commander to change the data.
- Press **MUTING** then **ENTER** to save into the memory.

Service Adjustment Mode Memory

	Mode	Category	Display Item	Item Data
Signal Type	service	defl	hsiz	16
	ntsc			
	vchp	00000000	00000000	

MUTING Green
 ↓
ENTER Red

- Press **8** then **ENTER** on the Remote Commander to initialize.

	Mode	Category	Display Item	Item Data
Signal Type	service	defl	hsiz	16
	ntsc			
	vchp	00000000	00000000	

MUTING Green
 ↓
ENTER Red

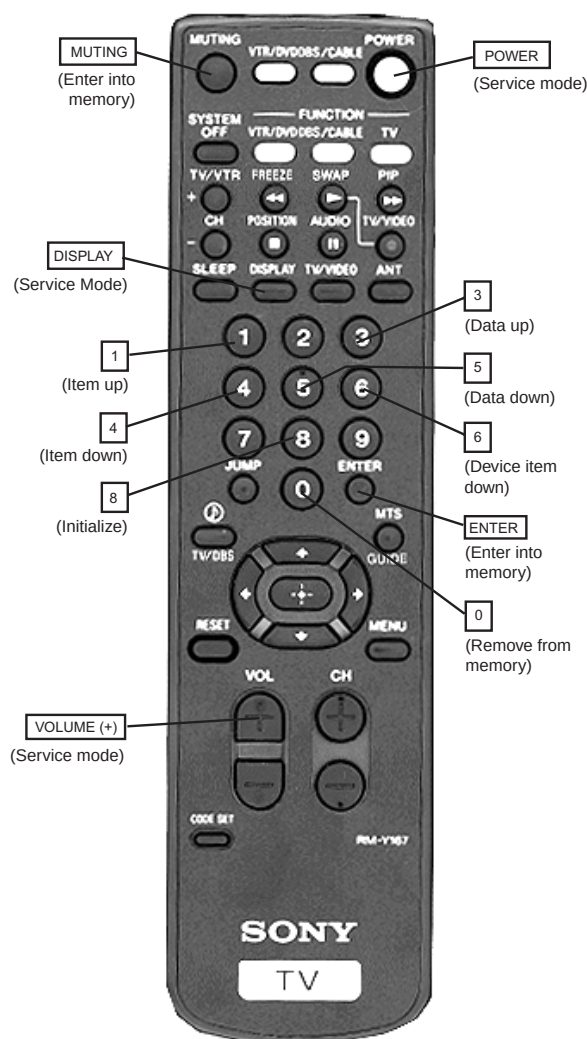
Carry out step 1 when adjusting IDs 0–6 and when replacing and adjusting IC003.

- Turn set off then on to exit service adjustment mode.

4-2. MEMORY WRITE CONFIRMATION METHOD

- After adjustment, remove the power plug from the AC outlet, then plug it in again.
- Turn the power switch ON and set to service mode.
- Call the adjusted items again to confirm they were adjusted.

4-3. ADJUSTMENT BUTTONS AND INDICATORS



RM-Y149A

Adjustment Items

Reg #	ITEM	FUNCTION	RANGE	FIX DATA	NTSC	PAL M	PAL N	VIDEO	RF	AVERAGE DATA
1	HSIZ	Horizontal Size Adjustment	0-63		15	12	7			14
2	HPOS	Horizontal Position Adjustment	0-63		13	8	9			17
3	VBOW	Vertical Line Bowing Adj.	0-15		9	10	8			6
4	VANG	Vertical Line Bowing Slant Adj.	0-15		8	10	9			12
5	VTRP	TRAPEZIUM	0-31		19	14	14			16
6	HTRP	Horiz. Trapezoid	0-15		6	7	5			0
7	TROT	Tilt Correction	0-63		31	31	31			31
8	PAMP	Horizontal PIN distortion Adj.	0-63		19	19	21			20
9	UPIN	Upper PIN Distortion Adj.	0-63		34	33	36			35
10	LPIN	Lower PIN Distortion Adj.	0-63		32	34	40			34
11	VSIZ	Vertical Size Adjustment	0-63		32	43	29			38
12	VPOS	Vertical Position Adj.	0-63		30	30	32			29
13	VLIN	Vertical lineality Adj.	0-15		3	6	10			5
14	SCOR	Vertical "S" Correction Adjustment	0-15		6	8	10			7
15	VZOM	16:9 CRT Z Mode on/off	0-1	0						0
16	EHT	Vertical High-Voltage Compensation	0-15	5						5
17	ASP	Aspect Ratio control	0-63	47						47
18	SCRL	16:9 CRT Z Mode Trans. Scroll	0-63	31						31
19	HBLK	Horizontal Blanking on/off	0-1	1						1
20	LBLK	Left Blanking Adjustment	0-15	13						14
21	RBLK	Rigth Blanking Adjustment	0-15	8						8
22	HDW	Horizontal Drive Pulse Width		1						1
23	EWDC	"Parabola" EW, D.C. Adjustment	0-1	0						0
24	LVLN	Lower Screen BTM Vertical Line Adj.	0-15	0						0
25	UVLN	Upper Screen BTM Vertical Line Adj.	0-15	0						0
26	INTL	INTERLACE	0-3	0						0
27	G2SW		0-1	0						0
28	G2LV		0-7	0						0
29	HOSC	Horizontal VCO Oscillation Freq.	0-15	12						7
30	VSS	Vertical Sync Slice Level	0-1	0						0
31	HSS	Horizontal Sync Slice Level	0-1	0						0
32	HMSK	For Macro Vision	0-1	0						0
33	VTMS	Select Signal VTIM Pin	0-3	0						0
34	CDMD	Vertical Count Down Mode Switching	0-3					3	0	3
35	AFC	AFC Loop Gain Switching	0-3	0						0
36	FIFR	Field Frequency	0-3	1						3
37	VBLK	VBLKW	0-3	0						0
38	REFP	REFP	0-1	0						0
39	JPSW	JUMPSW	0-1	MENU						0
40	RDRV	R Output Drive control	0-63	41						38
41	GDRV	G Output Drive control	0-63	25						28
42	BDRV	B Output Drive control	0-63	25						26
43	RCUT	R Output Cutoff control	0-15	31						31
44	GCUT	G Output Cutoff control	0-15	15						13
45	BCUT	B Output Cutoff control	0-15	12						14
46	SCON	SUB CONT	0-15	8						10
47	SHUE	Sub HUE adjustment	0-31	16						16
48	SCOL	Sub COLOR adjustment	0-31		18	18	18			18
49	SBRT	Sub BRIGHTNESS adjustment	0-31	16						17
50	CHUE	SUB HUE (Except YUV)	0-31	7						6
51	CCOL	SUB COLOR (Except YUV)	0-31		7	7	7			4
52	UOFS	YUV U OFFSET	0-15	7						7
53	VOFS	YUV V OFFSET	0-15	7						7
54	RON	R Output on/off	0-1	1						1
55	GON	G Output on/off	0-1	1						1
56	BON	B Output on/off	0-1	1						1
57	AXPL	Axis PAL	0-1	0						0
58	AXNT	Axis NTSC	0-1	1						1
59	CBPF	Chroma BPF on/off	0-1	1						1
60	CTRP	Y TRAP FILTER on/off	0-1	1						1
61	COFF	Color On/off	0-1	0						0
62	KOFF	Set Color Killer	0-1	0						0
63	SSHP	Sub SHARPNESS	0-15	5						5
64	SHPF	SHARPNESS Circuit Fo	0-3	Palette						2
65	PREL	Pre-Shoot/ Over-Shoot	0-1	1						0
66	Y-DC	DC transmittion Ratio Switching	0-3	Palette						2
67	GAMM	Gamma Correction	0-3	Palette						2
68	ABLM	ABL Mode Switch	0-1	1						1
69	VTH	ABL CD VHT Switching	0-1	1						1
70	YDEL	Y Delay Time Control	0-15	7						7
71	NCOL	No Color ID	0-1	1						1
72	FSC	FSC Out on/off	0-1	1						1
73	K-ID	Killer ID Control on/off	0-1	0						0
74	GDOF		0-31	3						3
75	BDOF		0-31	16						16
76	GCOF		0-31	16						16
77	BCOF		0-31	7						7
78	SYSC	Color System	0-7	4						4
79	VENH	Vertical Enhancement	0-7	Palette						3

Reg #	ITEM	FUNCTION	RANGE	FIX DATA	NTSC	PAL M	PAL N	VIDEO	RF	AVERAGE DATA
80	PDSO	PDS OFF	0-1	0						0
81	CK	CK	0-1	0						0
82	VNL	VNL	0-15	3						3
83	HPK	HPK	0-1	0						0
84	HPKO	HPK OFF	0-1	Palette						0
85	CORE	CORE	0-3	2						1
86	TRAP	TRAP	0-1	1						1
87	CHTR	CH TRAP	0-1	0						0
88	CBPF	CBPF	0-1	1						1
89	ENHO	ENHOFF	0-1	0						0
90	NMRD	NMRD	0-3	0						0
91	YAPS	YAPS	0-3	3						3
92	CLKS	CLKS	0-3	0						0
93	NSTD	NSTD	0-3	0						0
94	MSS	MSS	0-3	0						0
95	KILS	KILS	0-3	1						1
96	ADIN	ADIN	0-1	0						0
97	EXCS	EXCSS	0-3	1						1
98	CPP	CPP	0-3	2						2
99	HDP	HDP	0-7	4						4
100	CDL	CDL	0-7	4						4
101	DYCR	DYCOR	0-15	2						2
102	DYGN	DYGAIN	0-15	10						10
103	DCCR	DCCOR	0-15	3						3
104	DCGN	DCGAIN	0-15	6						6
105	YNRL	YNRLIM	0-3	1						1
106	CNRL	CNRLIM	0-3	1						1
107	WSC	WSC	0-3	1						1
108	VTRH	VTRH	0-3	1						1
109	VTRR	VTRR	0-3	1						1
110	LDSR	LDSR	0-3	2						2
111	VAPG	VAPGAIN	0-7	3						3
112	VAPI	VAPINV	0-31	6						6
113	TEST	TEST	0-1	0						0
114	YPFT	YPFT	0-3	3						3
115	YPFG	YPFG	0-15	7						7
116	CC3N	CC3N	0-1	0						0
117	SELD	SELD	0-1	1						1
118	D2GN	D2GAIN	0-7	4						5
119	YHCR	YHCOR	0-3	0						0
120	YPFC	YPFCOR	0-1	0						0
121	SHT	SHT	0-3	0						0
122	MVT	MVT	0-1	0						0
123	OTT	OTT	0-1	0						0
124	CL2D	CL2D	0-1	1						1
125	CLKG	CLKGGT	0-1	0						0
126	HPLL	HPLLFS	0-1	1						1
127	BPLL	BPLLFS	0-1	0						0
128	FSCF	FSCFG	0-1	0						0
129	PLLS	PLLS	0-1	1						1
130	KILR	KILR	0-15	3						3
131	HSSL	HSSL	0-15	12						12
132	VSSL	VSSL	0-15	8						8
133	BGPS	BGPS	0-15	4						4
134	BGPW	BGPW	0-15	10						10
135	ADCK	ADCLKS	0-3	3						3
136	NDSW	NSDSW	0-1	1						1
137	PFRN	FREE_RUN	0-1	0						0
138	PRVS	RVS	0-1	0						0
139	PCON	CONTRAST	0-127	45						45
140	PUCO	U-DAC	0-127	10						16
141	PVCO	V-DAC	0-127	18						24
142	PHUE		0-31	15						15
143	PKIL	KILLER	0-1	0						0
144	PSEP	EXT_SC_SEL	0-3	2						2
145	PHIM		0-1	0						0
146	PSUB		0-1	0						0
147	PBGS	BG_START	0-63	14						14
148	PDL0		0-15	6						6
149	PDL1		0-15	13						13
150	PBRT	Y_OFFSET	0-31	25						25
151	PVP1			0						0
152	PUP1			0						0
153	PVP2			0						0
154	PUP2			0						0
155	PVP3			0						0
156	PUP3			0						0

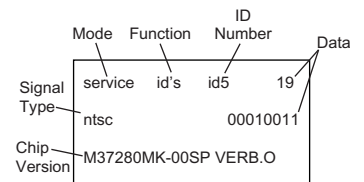
Reg #	ITEM	FUNCTION	RANGE	FIX DATA	NTSC	PAL M	PAL N	VIDEO	RF	AVERAGE DATA
157	PACS	SET_ACC	0-1	1						1
158	PSDL	SYNC_DELAY	0-3	0						0
159	PDCO		0-3	0						0
160	PCGA	C_GAIN	0-1	1						1
161	PAAF		0-1	0						0
162	PSU2		0-1	0						0
163	PCVF		0-1	0						0
164	PBIT	BITSEL	0-1	0						0
165	PAFC	AFCBITSEL	0-1	0						0
166	PACC	ACC_LEVEL	0-63	22						22
167	PBUR	BURST_CLK	0-1	0						0
168	PEVE	EVENUPRA	0-1	0						0
169	PINW	INV_WFF	0-1	0						0
170	PINR	INV_REF	0-1	0						0
171	PREF	RFF_FIX	0-1	0						0
172	PARE	AUTO_REF	0-1	1						1
173	PAVE	AVERAGE	0-1	0						0
174	PFRA	FREE_RUN_ADJ	0-15	0						0
175	PPAL	SUB_PALM_JUDGE	0-255	0						0
176	PHPO		0-31	9						6
177	PVPO		0-31	22						22
178	PHTI	HT	0-15	5						9
179	PHAJ	ADJ	0-15	1						1
180	PBGY	BGY	0-15	0						0
181	PCRO	CROSS_SEL	0-1	0						0
182	PPAR	PALRY	0-63	2						2
183	PHPF	HPFOFF	0-1	0						0
184	PFSC	FSC_OUTPUT	0-1	0						0
185	PVCH	SET_VCHIP	0-1	0						0
186	PVON	VCHIP_ONLY	0-1	1						1
187	PVLN	LINE_NUM	0-31	17						17
188	PVSB	STB_DLY	0-255	64						64
189	PVLV	L_LEVEL	0-255	130						130
190	SBAL	Sub Balance	0-15	5						5
191	SBAS	Sub Bass	0-7	0						0
192	STRE	Sub Treble	0-7	3						3
193	BBEL	BBE Low	0-15	0						0
194	BBEH	BBE High	0-15	0						0
195	BBE	BBE	0-1	0						0
196	AUX	SRS, Simulated	0-3	0						0
197	DISP	O.S.D Display position	0-130	20						34
198	HCLW	Horizontal Count Lower limit	0-255	16				16		16
199	HCHG	Horizontal Count High limit	0-255	64				64		64
200	ID0		0-255							23
201	ID1		0-255							31
202	ID2		0-255							215
203	ID3		0-255							130
204	ID4		0-255							233
205	ID5		0-255							19
206	ID6		0-255							132

Notes:

No. 1–206 show the order that each adjustment mode may be selected while in service mode.

Data Range shows the range of possible settings for each adjustment mode.

Initial Data shows the standard settings for each adjustment mode.



4-4. MA BOARD ADJUSTMENTS

H. Frequency (Free Run) Check

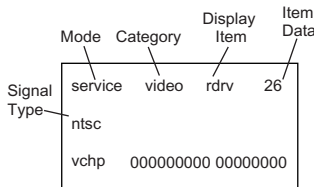
1. Input a TV mode (RF) with no signal.
2. Connect a frequency counter to base of Q501 (TP-500 H. DRIVE) on the A Board.
3. Check H. Frequency for 15735 ± 200 Hz.

V. Frequency (Free Run) Check

1. Select video 1 with no signal input.
2. Set the conditions for a standard setting.
3. Connect the frequency counter to TP-508 (V OUT) or CN501 pin ⑥ (V DY+) and ground on the A Board.
4. Check that V. Frequency shows 60 ± 4 Hz.

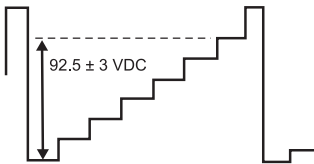
Drive (RDRV)

1. Input a color-bar signal and set the level to 75%.
2. Set in Standard mode.
3. Activate the Service Adjustment Mode.
4. Set both GON and BON items. Using [3] and [6]; set each to the following values. Leave RON set to "1".



R ON: ON (1)
G ON: OFF (0)
B ON: OFF (0)

5. Connect an oscilloscope probe to CA Board, J701 Pin 12 (KR) (Red Out).
6. Select RDRV with [1] and [4].
7. Adjust the value of RDRV with [3] and [6] for 92.5 ± 3 VDC.



8. Reset GON and BON values to "1".

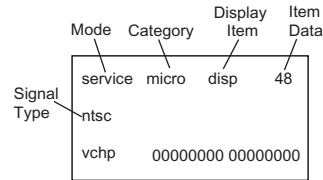
R ON: ON (1)
G ON: ON (1)
B ON: ON (1)

9. Press [MUTING] then [ENTER] to save into the memory.

Display Position Adjustment (DISP)

1. Input a color-bar signal.
2. Set to Service Adjustment Mode.
3. Select DISP with [1] and [4].

4. Adjust values of DISP with [3] and [6] to adjust characters to the center.
5. Write to memory by pressing [MUTING] then [ENTER].
6. Check to see if the text is displayed on the screen.

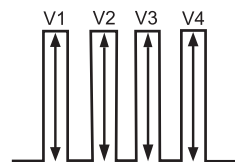


Sub Bright Adjustment (SBRT)

1. Input a monoscope signal.
2. Activate the Service Adjustment Mode.
3. Set the PICTURE and BRIGHTNESS to minimum.
4. Select the SBRT item with [1] and [4].
5. Adjust the values of SBRT with [3] and [6] to obtain a faintly visible crosshatch.
6. Press [MUTING] then [ENTER] to save into the memory.

Sub Hue, Sub Color Adjustment (CHUE, CCOL)

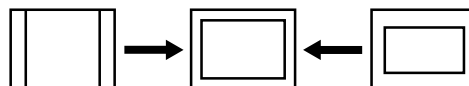
1. Input a color-bar signal.
2. Activate the Service Adjustment Mode.
3. Connect an oscilloscope probe to CA Board, CN705 Pin ④ Blue Out.
4. Select the CHUE and CCOL item with [1] and [4].
5. While showing the CHUE item, adjust the waveform with [3] and [6] until the second and third bars show the same level ($V2 = V3 < 0.1$ Vp-p).
6. While showing the CCOL item, adjust the waveform with [3] and [6] until the first and fourth bars show the same level ($V1 = V4 < 0.1$ Vp-p).



7. Press [MUTING] then [ENTER] to save into the memory.

V. Size Adjustment (VSIZ)

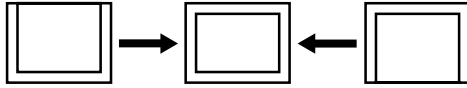
1. Input a crosshatch signal.
2. Activate the Service Adjustment Mode.
3. Select the VSIZ item with [1] and [4].
4. Adjust value of VPOS with [3] and [6] for the best vertical center.
5. Press [MUTING] then [ENTER] to save into the memory.



V. Center Adjustment (VPOS)

Perform this adjustment after performing H. Frequency (Free Run) Check.

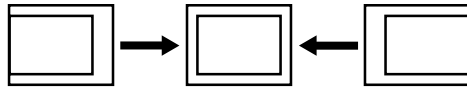
1. Input a crosshatch signal.
2. Activate the Service Adjustment Mode.
3. Select the VPOS item with **[1]** and **[4]**.
4. Adjust value of VPOS with **[3]** and **[6]** for the best vertical center.
5. Press **[MUTING]** then **[ENTER]** to save into the memory.



H. Center Adjustment (HPOS)

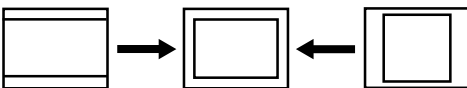
Perform this adjustment after performing H. Frequency (Free Run) Check.

1. Input a crosshatch signal.
2. Activate the Service Adjustment Mode.
3. Select the HPOS item with **[1]** and **[4]**.
4. Adjust the value of HPOS with **[3]** and **[6]** for the best horizontal center.
5. Press **[MUTING]** then **[ENTER]** to save into the memory.



H. Size Adjustment (HSIZ)

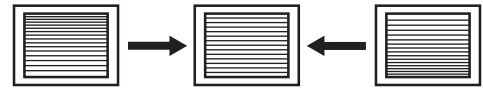
1. Input a monoscope signal.
2. Activate the Service Adjustment Mode.
3. Select HSIZ with **[1]** and **[4]**.
4. Adjust with **[3]** and **[6]** for the best horizontal size.
5. Press **[MUTING]** then **[ENTER]** to save into the memory.



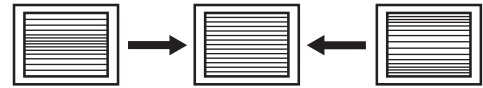
V. Linearity (VLIN), V. Correction (SCOR), Pin Amp (PAMP), and Horizontal Trapezoid (HTRP) Adjustments

1. Input a crosshatch signal.
2. Activate the Service Adjustment Mode.
3. Select VLIN, SCOR, PAMP, and HTRP with **[1]** and **[4]**.
4. Adjust with **[3]** and **[6]** for the best horizontal size.
5. Press **[MUTING]** then **[ENTER]** to save into the memory.

V LINEARITY (VLIN)



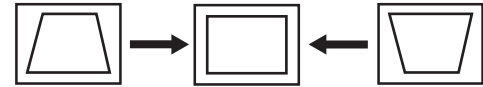
V CORRECTION (SCOR)



PIN AMP (PAMP)



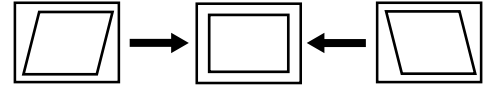
HORIZONTAL TRAPEZOID (HTRP)



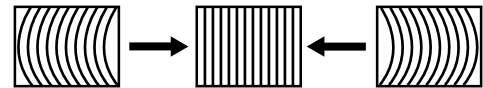
V. Angle (VANG), V. Bow (VBOW), Upper pin (UPIN) and Low Pin (LPIN) Adjustments

1. Input a crosshatch signal.
2. Activate the Service Adjustment Mode.
3. Select VANG, VBOW, UPIN, and LPIN with **[1]** and **[4]**.
4. Adjust with **[3]** and **[6]** for the best picture.
5. Press **[MUTING]** then **[ENTER]** to save into the memory.

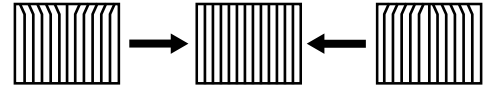
V ANGLE (VANG)



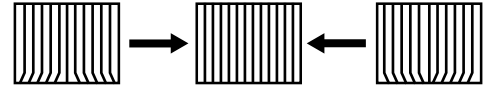
V BOW (VBOW)



UPPER PIN (UPIN)



LOW PIN (LPIN)



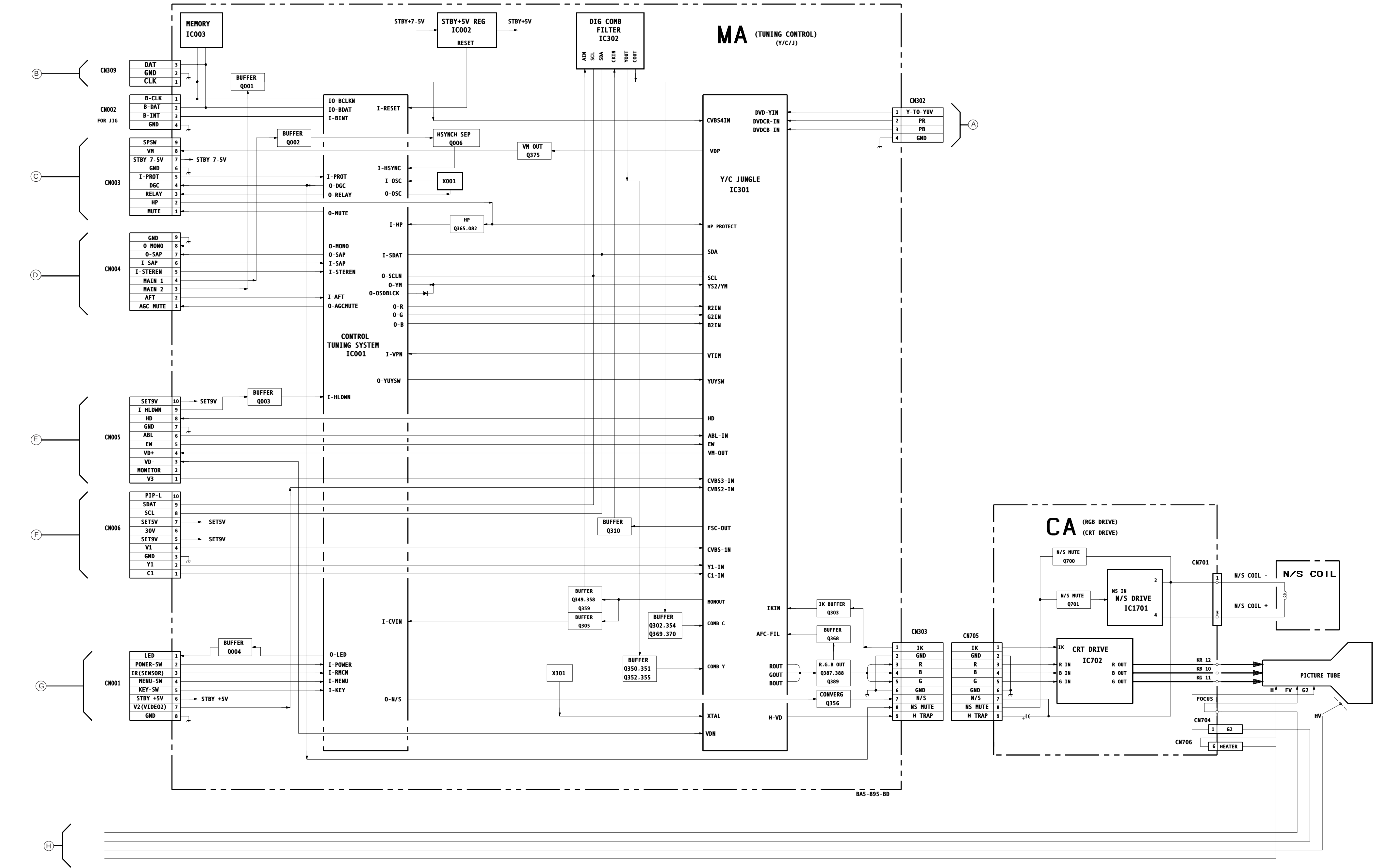
Service Adjustment Mode Memory

1. After completing all adjustments, press **[0]** then **[ENTER]**.

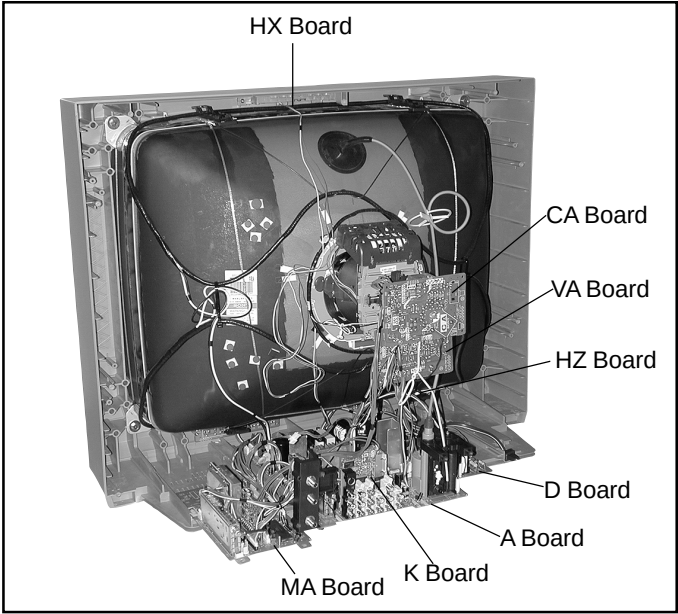
Read From Memory

Mode	Category	Display Item	Item Data	
service	defl	vbow	7	Green
ntsc				[0]
vchp	00000000	00000000		Red
				[ENTER]

BLOCK DIAGRAM (2/2)



6.2 CIRCUIT BOARD LOCATIONS



6-3. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

- All capacitors are in mF unless otherwise noted. pF: mmF 50 WV or less are not indicated except for electrolytic and tantalums.
- All electrolytics are 50V unless otherwise specified.
- Indication of resistance, which does not have one for rating electrical power, is as follows:
Pitch: 5mm
Rating electrical power 1/4W (CHIP: 1/10W)
- All resistors are in ohms.
 $K\Omega = 1000\Omega$ $M\Omega = 1000K\Omega$
- : nonflammable resistor
- : fusible resistor
- : internal component
- : panel designation and adjustment for repair
- : earth-ground
- : earth-chassis
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- The components identified by in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by , make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by and repeat the adjustment until the specified value is achieved (refer to Safety Related Adjustments on page 14).
- When replacing parts shown in the table below, be sure to perform the related adjustments.

Part Replaced ()	Adjustment ()
DY, T505, CRT, IC501, C507, C520, C505, C509, C515, T504, T503, C551, L510, C546, C537, C547, D517, D518, D519, R560, R561, R562, R563, R565, R566, R567, R525.....A Board	HV HOLD-DOWN (R564)
IC301.....MA Board	
IC601, PH601.....A Board	B+ VOLTAGE CONFIRMATION

- All voltages are in Volts
- Voltage is DC with respect to ground unless otherwise noted.
- Readings are taken with a 10MW digital multimeter.
- Readings are taken with a color-bar signal input.
- Voltage variations may be noted due to normal production tolerance.
- Circled numbers are waveform references.
- * : cannot be measured
- : B + Line
- : B - Line
- : Signal path

Reference Information

RESISTOR	:	RN	METAL FILM
	:	RC	SOLID
	:	FPRD	NON FLAMMABLE CARBON
	:	FUSE	NON FLAMMABLE FUSIBLE
	:	RW	NON FLAMMABLE WIREWOUND
	:	RS	NON FLAMMABLE METAL OXIDE
	:	RB	NON FLAMMABLE CEMENT
	:		ADJUSTMENT RESISTOR
COIL	:	LF-8L	MICRO INDUCTOR
CAPACITOR	:	TA	TANTALUM
	:	PS	STYROL
	:	PP	POLYPROPYLENE
	:	PT	MYLAR
	:	MPS	METALIZED POLYESTER
	:	MPP	METALIZED POLYPROPYLENE
	:	ALB	BIPOLAR
	:	ALT	HIGH TEMPERATURE
	:	ALR	HIGH RIPPLE

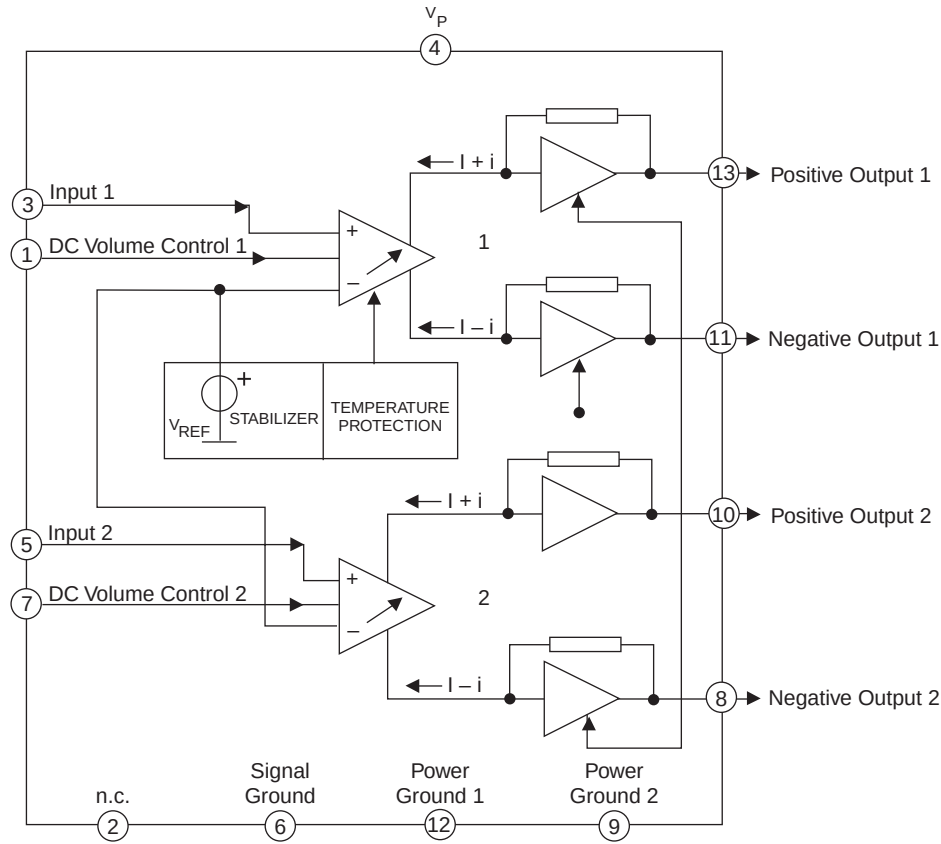
Note:

The components identified by shading and mark are critical for safety. Replace only with the part number specified. The symbol (displayed on component side of the circuit board) indicates fast operating fuse. Replace only with fuse of the same rating as marked.

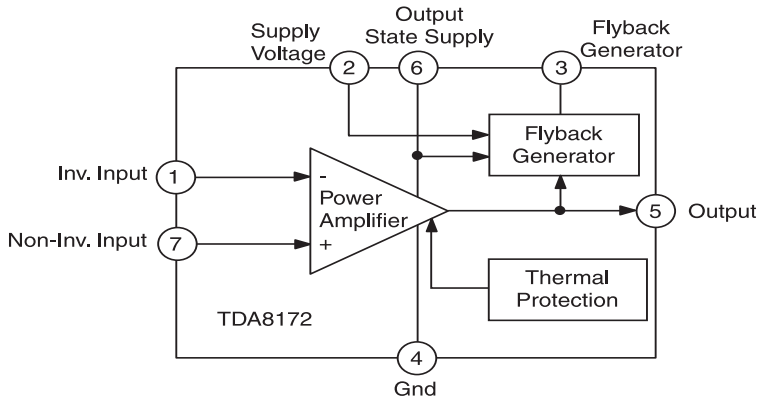
Les composants identifiés per un tramé et une marque sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié. Le symbole indique une fusible a action rapide. Doit être remplacée par une fusible de meme valeur, comme marque.

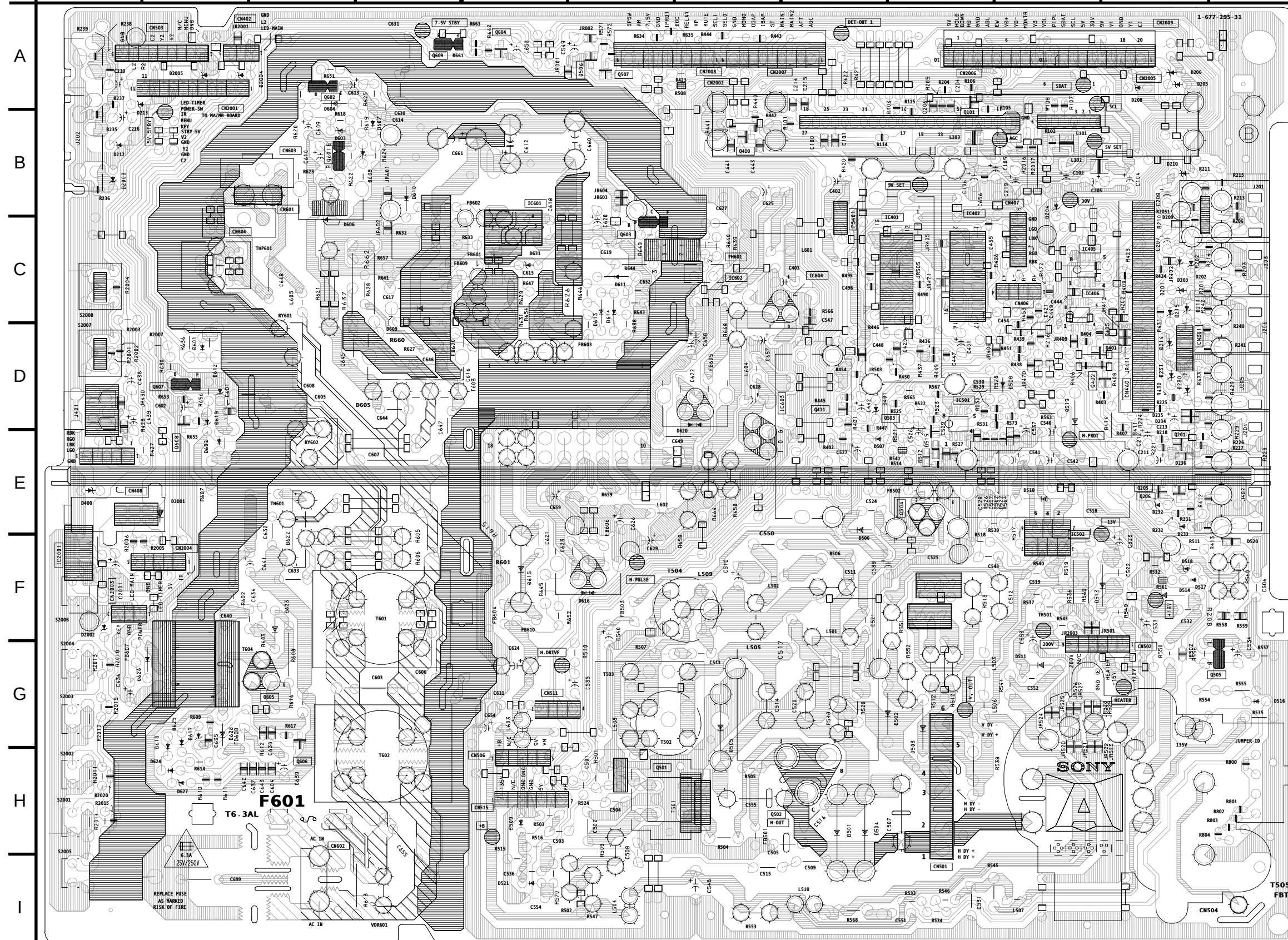
A BOARD IC BLOCK DIAGRAMS

A BOARD: IC401 TDA7057AQ/N2

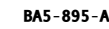


A BOARD: IC502 TDA8172





DIODE		D611	C-6
D201	C-11	D612	D-2
D202	C-11	D613	C-6
D203	C-11	D614	C-6
D204	B-10	D615	F-5
D205	A-11	D616	F-6
D206	A-11	D617	H-2
D208	A-11	D618	H-2
D209	C-11	D619	D-2
D210	B-11	D620	D-7
D211	C-11	D622	F-3
D212	B-1	D623	G-2
D213	B-1	D624	G-5
D214	D-11	D625	H-2
D215	C-11	D626	G-1
D230	D-11	D627	H-2
D231	D-11	D628	G-2
D232	E-11	D2001	E-2
D233	E-11	D2002	F-1
D401	D-8	D2003	B-1
D501	H-8	D2004	A-2
D502	G-9	D2005	A-2
D503	G-9	IC	
D504	H-8	IC401	C-8
D505	G-7	IC501	D-9
D506	F-8	IC502	F-10
D507	E-8	IC601	B-5
D508	D-9	IC602	C-7
D509	H-5	IC603	D-7
D510	E-10	IC604	C-8
D511	G-10	IC2001	E-1
D512	E-9	TRANSISTOR	
D513	F-10	Q101	A-9
D514	F-11	Q410	B-7
D515	E-9	Q411	D-8
D516	G-11	Q501	H-7
D517	F-11	Q502	H-7
D518	F-11	Q503	D-9
D519	D-10	Q504	E-9
D520	F-12	Q505	G-12
D521	I-5	Q506	A-6
D522	E-9	Q507	A-6
D601	D-2	Q601	B-3
D602	E-2	Q602	A-3
D603	B-3	Q603	C-6
D604	B-3	Q604	A-5
D605	D-4	Q605	G-3
D606	C-3	Q606	H-3
D607	B-4	Q607	D-2
D608	B-3	Q608	D-2
D609	C-4	Q609	A-4
D610	B-4		



All voltages are in V

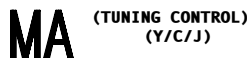
All voltages are in V

All voltages are in V

9



201.2 Vp-p (H)



BA5-895-MA

IC001		18	0.1	37	N/C	56	1.0	IC003		8	3.4	27	2.4	46	4.3	IC302		18	3.2
pin	volt	19	4.3	38	5.0	57	NC	pin	volt	9	4.8	28	3.5	47	5.2	pin	volt	19	1.9
1	0.5	20	0.1	39	NC	58	0.1	1	GND	10	1.7	29	3.5	48	5.2	1	5.0	20	2.4
2	4.8	21	NC	40	NC	59	NC	2	GND	11	0.0	30	5.9	49	GND	2	1.4	All voltages are in V	
3	NC	22	5.0	41	NC	60	NC	3	GND	12	4.8	31	5.5	50	4.8	3	3.2		
4	5.0	23	NC	42	4.8	61	0.1	4	GND	13	8.9	32	7.6	51	5.2	4	2.4		
5	0.0	24	5.0	43	4.8	62	0.1	5	4.8	14	NC	33	3.6	52	5.2	5	1.9		
6	0.0	25	2.1	44	NC	63	0.1	6	4.8	15	NC	34	2.3	53	9.0	6	5.0		
7	2.4	26	NC	45	4.8	64	0.1	7	GND	16	4.8	35	2.3	54	5.3	7	0.0		
8	4.4	27	0.3	46	NC	IC002		8	5.0	17	4.4	36	3.9	55	1.6	8	5.0		
9	NC	28	2.2	47	4.8	pin	volt	IC301		18	GND	37	1.9	56	1.7	9	4.8		
10	NC	29	GND	48	0.1	1	GND	pin	volt	19	NC	38	1.9	57	1.1	10	4.8		
11	0.1	30	2.2	49	0.1	2	5.0	1	N/C	20	6.4	39	2.0	58	7.2	11	0.0		
12	NC	31	2.3	50	5.0	3	4.9	2	GND	21	3.9	40	0.0	59	4.8	12	0.0		
13	0.5	32	GND	51	5.0	4	7.2	3	5.2	22	5.6	41	4.6	60	4.8	13	2.6		
14	NC	33	5.0	52	NC	5	5.0	4	5.0	23	8.9	42	4.6	61	4.8	14	2.1		
15	0.1	34	2.5	53	1.0	6	GND	5	4.8	24	N/C	43	4.6	62	NC	15	5.0		
16	0.1	35	2.5	54	0.1	7	GND	6	5.0	25	GND	44	8.9	63	NC	16	0.0		
17	0.0	36	5.0	55	NC	8	NC	7	4.8	26	3.5	45	0.2	64	NC	17	2.5		

All voltages are in V

1 4.7 Vp-p (H)	2 3.8 Vp-p (8 MHz)	3 0.9 Vp-p (H)	4 0.8 Vp-p (H)
5 1.0 Vp-p (H)	6 4.7 Vp-p (V)	7 3.1 Vp-p (H)	8 2.9 Vp-p (H)
9 2.2 Vp-p (H)	10 1.4 Vp-p (V)	11 1.4 Vp-p (V)	12 3.5 Vp-p (H)
13 3.6 Vp-p (H)	14 4.0 Vp-p (H)	15 3.4 Vp-p (H)	16 3.5 Vp-p (H)
17 1.4 Vp-p (H)	18 1.1 Vp-p (H)	19 1.2 Vp-p (H)	

Q001		Q082		Q349		Q355		Q368		Q388	
pin	volt	pin	volt	pin	volt	pin	volt	pin	volt	pin	volt
B	5.0	B	0.6	B	4.4	B	0.0	B	2.4	B	1.9
C	GND	C	0.5	C	9.0	C	GND	C	9.0	C	GND
E	5.6	E	GND	E	3.8	E	3.0	E	2.4	E	2.5
Q002		Q302		Q350		Q356		Q369		Q389	
pin	volt	pin	volt	pin	volt	pin	volt	pin	volt	pin	volt
B	4.4	B	2.5	B	4.0	B	0.5	B	7.6	B	2.0
C	9.0	C	7.6	C	GND	C	1.3	C	5.8	C	GND
E	3.8	E	1.9	E	4.7	E	GND	E	8.3	E	2.6
Q003		Q303		Q351		Q358		Q370		All voltages are in V	
pin	volt	pin	volt	pin	volt	pin	volt	pin	volt		
B	0.6	B	3.6	B	7.8	B	2.4	B	5.8		
C	0.0	C	0.1	C	4.0	C	8.9	C	GND		
E	GND	E	3.5	E	8.4	E	1.8	E	6.4		
Q004		Q305		Q352		Q359		Q375			
pin	volt	pin	volt	pin	volt	pin	volt	pin	volt		
B	4.9	B	4.4	B	2.5	B	2.1	B	5.0		
C	GND	C	GND	C	7.8	C	GND	C	9.0		
E	3.9	E	5.0	E	1.9	E	2.7	E	4.4		
Q006		Q310		Q354		Q365		Q387			
pin	volt	pin	volt	pin	volt	pin	volt	pin	volt		
B	5.2	B	4.8	B	2.5	B	0.5	B	1.9		
C	0.7	C	GND	C	GND	C	3.8	C	GND		
E	5.0	E	5.4	E	3.2	E	GND	E	2.5		

All voltages are in V

DIODE		Q303	C-5
D001	D-2	Q305	B-4
D002	D-4	Q310	B-3
D003	C-3	Q349	C-4
D004	D-3	Q350	B-3
D005	C-1	Q351	B-3
D006	C-2	Q352	B-3
D075	C-3	Q354	A-3
D301	C-7	Q355	B-2
D305	C-5	Q356	D-3
D360	B-4	Q358	B-4
IC		Q359	B-4
IC001	C-2	Q365	C-4
IC002	C-1	Q368	C-6
IC003	C-2	Q369	B-3
IC301	D-7	Q370	A-3
IC302	B-1	Q375	B-5
TRANSISTOR		Q387	C-5
Q001	D-8	Q388	B-5
Q002	D-5	Q389	C-5
Q003	D-5	CRYSTAL	
Q004	D-2	X001	D-1
Q006	D-3	X301	C-8
Q082	B-3	X302	C-8
Q302	A-3	X303	C-8

1 **2** **3**

A

B

HX (KEY)

CN4001
3P
WHT-L
:S-MICRO

TO A BOARD
CN2003

1 POWER-SW
2 GND
3 KEY-SW

S4006
POWER

R4005
6.8k

R4004
2.2k

R4003
820

R4002
680

R4001
100
:CHIP

S4005
TV/V

S4004
CH+

S4003
CH-

S4002
VOL+

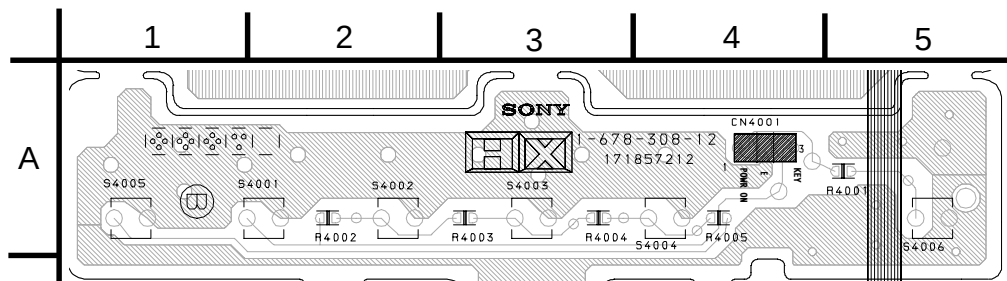
S4001
VOL-

BA5-895-HX

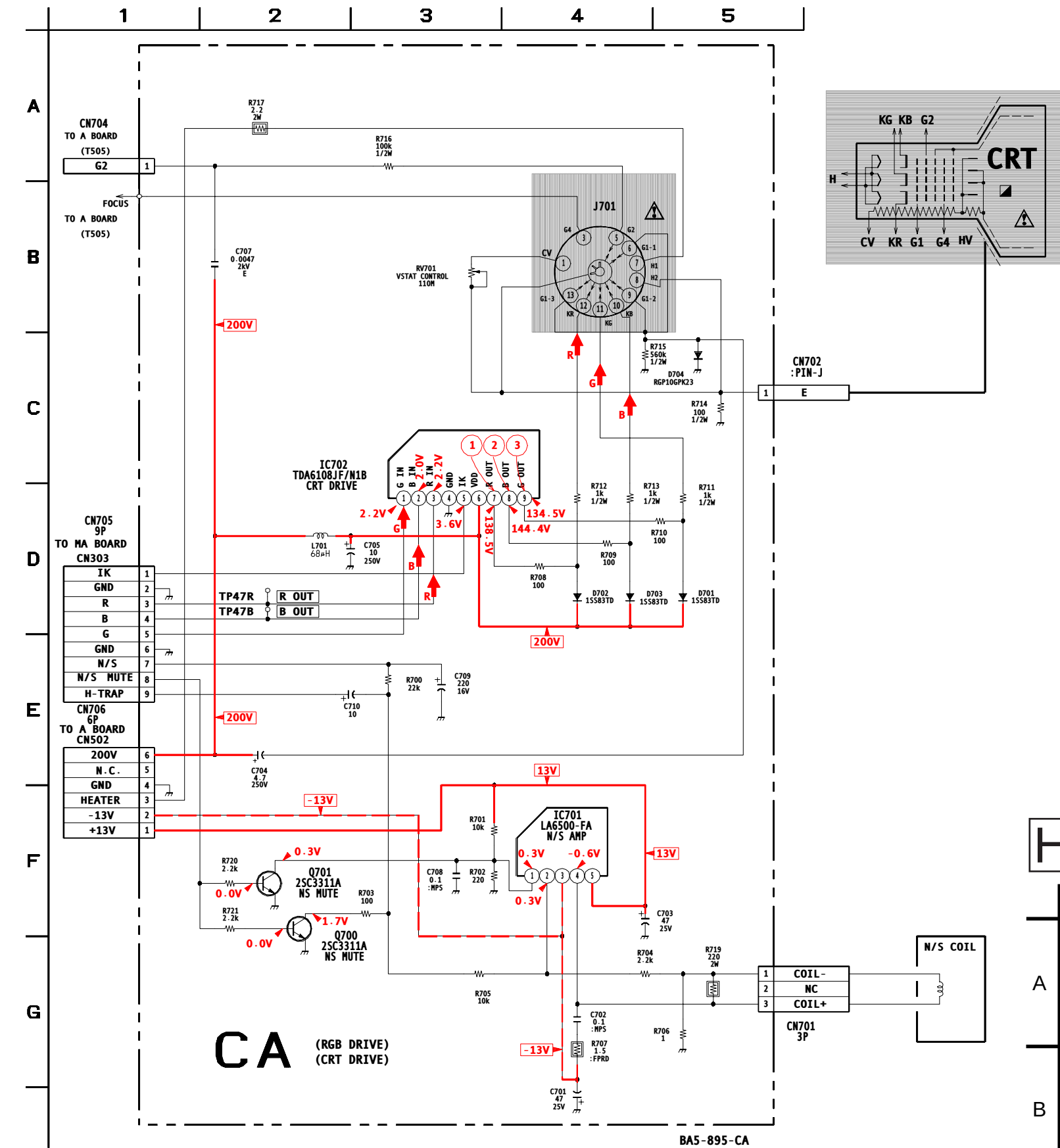
The diagram illustrates the internal architecture of the TMS99C01 video controller, showing its various functional blocks and their interconnections. The components are organized as follows:

- Input Section (Top Left):** Receives external signals including V_I IN (12), C_I IN (11), Y_I IN (13), C_I IN (14), C_R IN (15), C_B IN (16), C_M IN (17), C_S IN (18), C_D IN (19), C_E IN (20), C_F IN (21), C_G IN (22), C_H IN (23), C_I IN (24), C_J IN (25), C_K IN (26), C_L IN (27), C_M IN (28), C_N IN (29), C_O IN (30).
- Processing Blocks (Center):**
 - CHROMA SW:** Processes color information.
 - Y SW:** Processes luminance information.
 - MONITOR SW:** Controls monitor output.
 - VIDEO SW:** Controls video output.
 - <VIDEO SW> <SEL>**: Selects video source.
 - CLOCK DIVIDER:** Divides clock signals.
 - ATT:** Attenuator.
 - TAP-EO:** Tap-off point for equalization.
 - SW:** Switching circuitry.
 - SHARPNESS DL:** Sharpness detector.
 - SHARPNESS AMP:** Sharpness amplifier.
 - PHOTOVOLTAGE:** Photovoltage input.
 - VROT:** Vertical rotation control.
 - VM AMP:** Vertical motion amplifier.
 - VM LAY:** Vertical layer control.
 - (OFF-TSTN):** Off-test signal.
- Output Section (Bottom Right):** Generates final video signals including Y OUT (TAI22n) (21), DVD Y IN (22), DVD U IN (23), DVD V IN (24), YIN (From TAI22n) (25), YOUT (To TAI22n) (26), PIP V IN (27), PIP U IN (28), PIP V IN (29), YUV SW (30), YS2/YM (31), RZIN (32), GZIN (33), BZIN (34).
- Control and Timing Section (Left Side):**
 - APCFIL:** Active pixel filter.
 - XTAL:** Crystal oscillator.
 - FSCOUT:** Frame sync output.
 - VCC2:** Power supply pin.
 - GND2:** Ground pin.
 - Y CLAMP:** Vertical clamp.
 - APED:** Active pixel enable.
 - DVD Y IN:** Digital video data input.
 - DVD U IN:** Digital video data input.
 - DVD V IN:** Digital video data input.
 - YIN (From TAI22n):** Video input from TAI22n.
 - YOUT (To TAI22n):** Video output to TAI22n.
 - VMOUT:** Vertical motion output.
 - PIP V IN:** Picture-in-picture vertical input.
 - PIP U IN:** Picture-in-picture horizontal input.
 - PIP V IN:** Picture-in-picture vertical input.
 - YUV SW:** YUV switch.
 - YS2/YM:** YS2/YM input.
 - RZIN:** Red zoom input.
 - GZIN:** Green zoom input.
 - BZIN:** Blue zoom input.

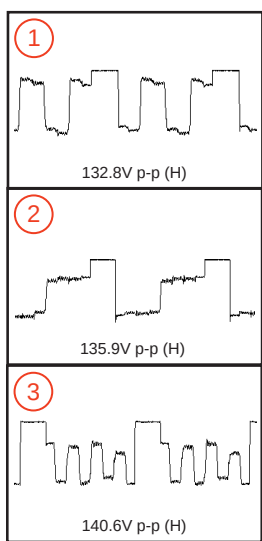
HX [KEY]



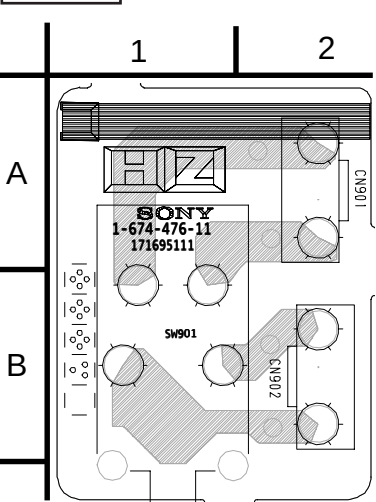
CA Board Schematic Diagram



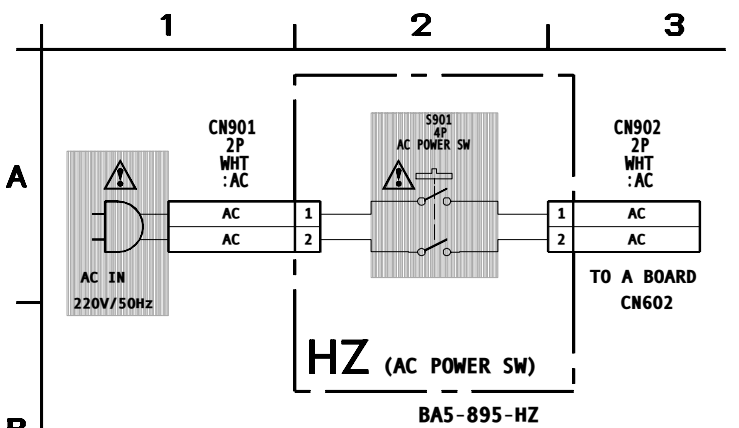
CA BOARD WAVEFORMS



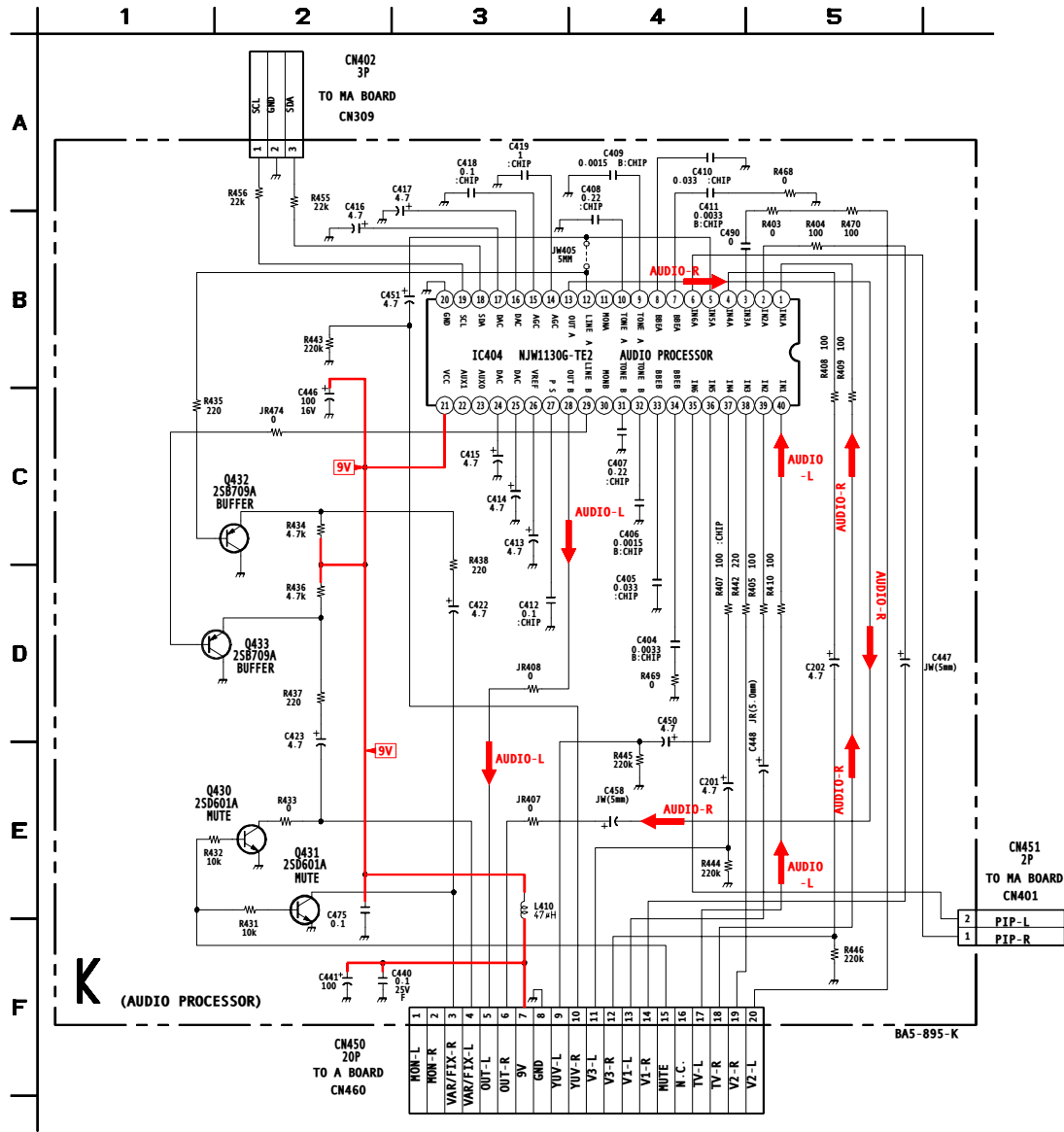
HZ [AC POWER SWITCH]



HZ Board Schematic Diagram



K Board Schematic Diagram



K BOARD IC VOLTAGE LIST

IC404		6	4.5	13	4.5	20	GND	27	3.9	34	4.5
pin	volt	7	4.7	14	1.0	21	8.9	28	4.5	35	4.5
1	4.5	8	4.5	15	4.5	22	NC	29	4.5	36	4.5
2	4.5	9	4.5	16	0.9	23	NC	30	N/C	37	4.5
3	4.5	10	4.5	17	0.9	24	1.3	31	4.5	38	4.5
4	4.5	11	N/C	18	4.8	25	1.3	32	4.5	39	4.5
5	4.5	12	4.5	19	4.9	26	4.4	33	4.5	40	4.5

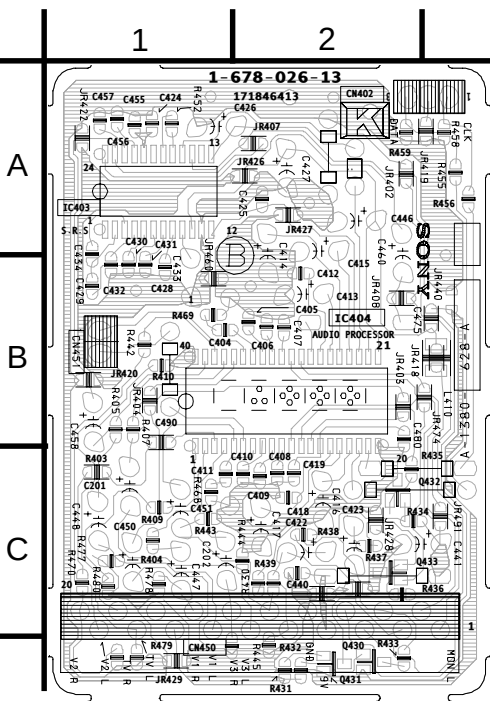
All voltages are in V

K BOARD TRANSISTOR VOLTAGE LIST

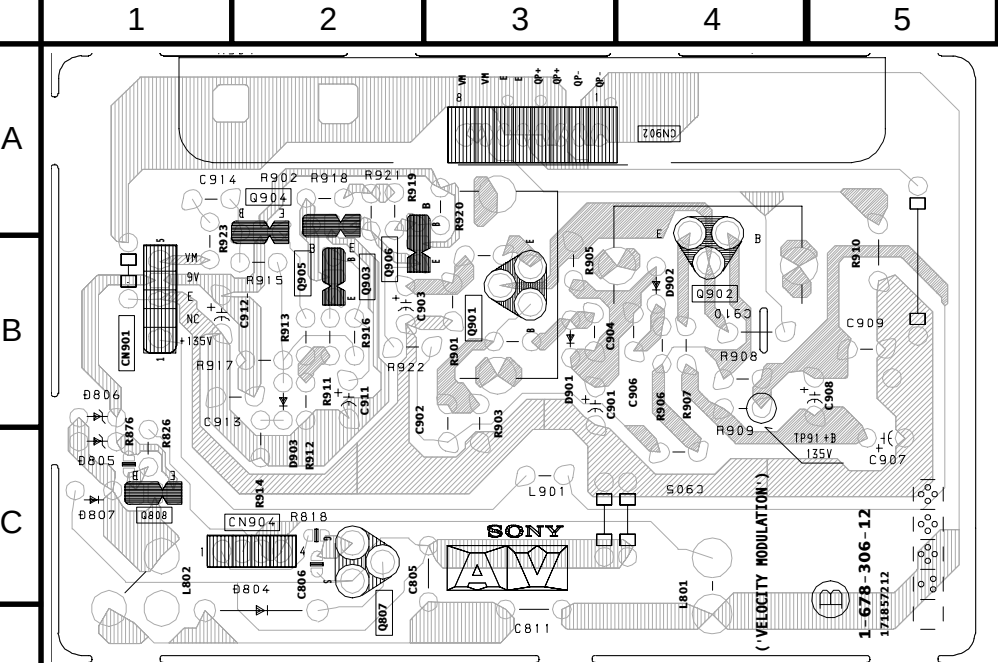
Q430		Q431		Q432		Q433	
pin	volt	pin	volt	pin	volt	pin	volt
B	0.3	B	0.3	B	4.5	B	4.5
C	0.0	C	0.0	C	GND	C	GND
E	GND	E	GND	E	5.1	E	5.2

All voltages are in V

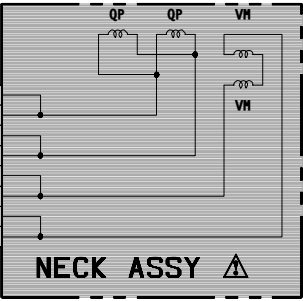
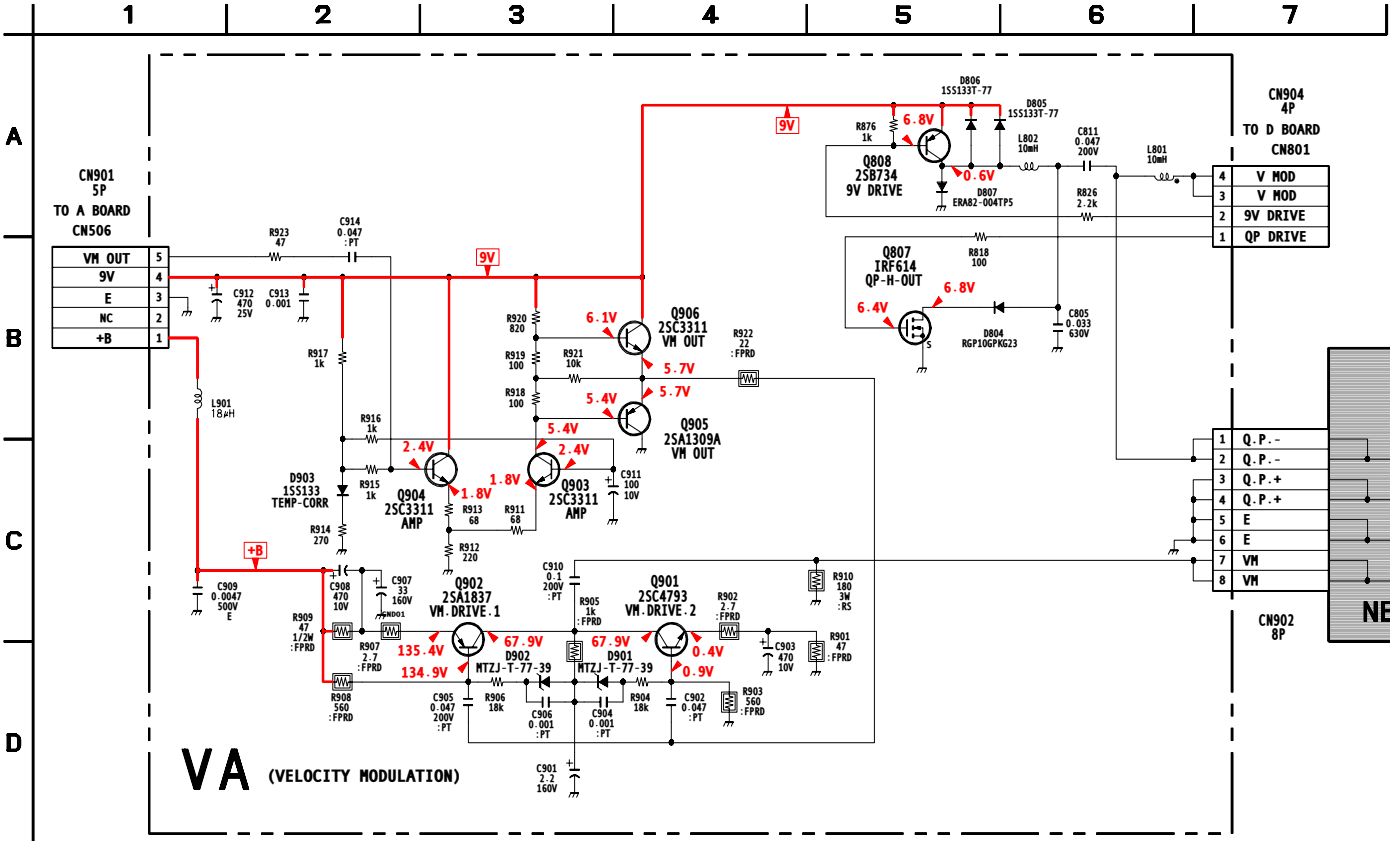
K [AUDIO PROCESSOR]



VA [VELOCITY MODULATION]

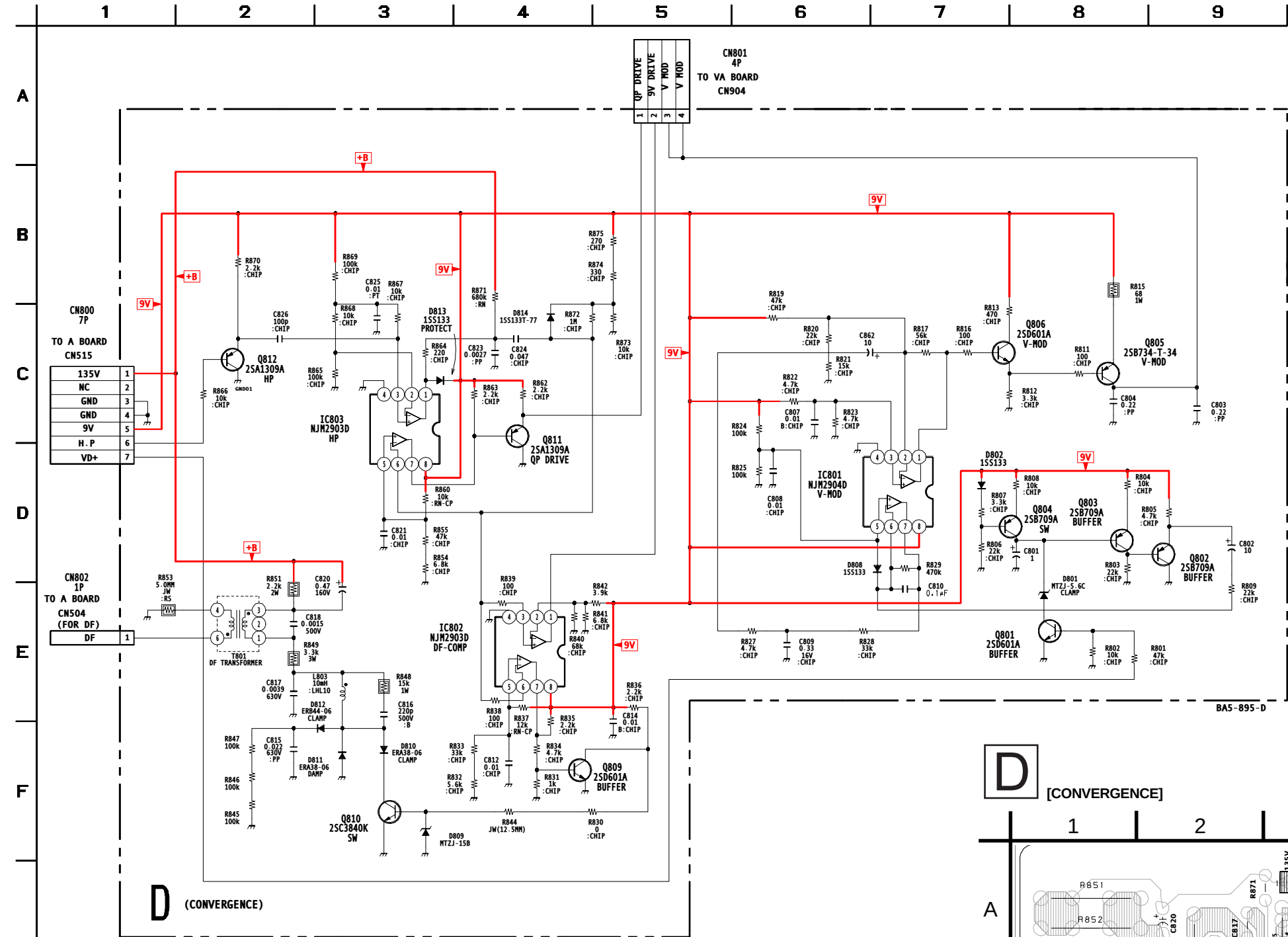


VA Board Schematic Diagram



BA5-895-VA

D Board Schematic Diagram



D BOARD IC VOLTAGE LIST

IC801			IC802			IC803		
pin	volt		pin	volt		pin	volt	
1	7.3	5	4.5	1	6.8	1	2.3	6
2	4.4	7	4.5	2	5.7	2	4.3	7
3	4.5	8	9.0	3	0.0	3	4.7	8

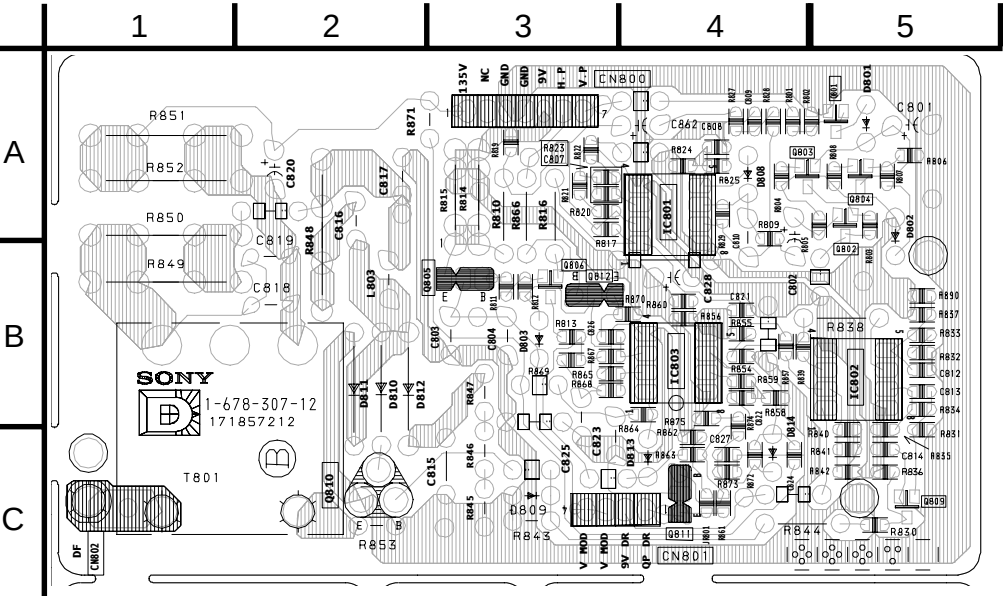
All voltages are in V

D BOARD TRANSISTOR VOLTAGE LIST

Q801		Q806	
pin	volt	pin	volt
B	-2.2	B	7.3
C	3.4	C	8.1
E	GND	E	6.7
Q802		Q809	
pin	volt	pin	volt
B	4.3	B	0.3
C	GND	C	0.3
E	4.9	E	GND
Q803		Q810	
pin	volt	pin	volt
B	6.4	B	0.3
C	4.3	C	1.2
E	7.0	E	GND
Q804		Q811	
pin	volt	pin	volt
B	7.4	B	6.3
C	6.4	C	GND
E	7.9	E	6.4
Q805		Q812	
pin	volt	pin	volt
B	6.7	B	0.0
C	0.6	C	GND
E	7.3	E	0.6

All voltages are in V

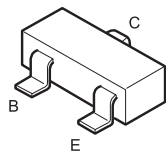
D [CONVERGENCE]



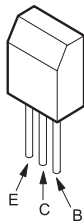
KV-29FS12K

6-4. SEMICONDUCTORS

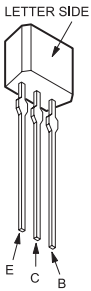
2SB709A-QRS-TX
2SD601A-QRS-TX



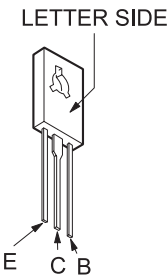
2SB734-T-34
2SC3209LK-TP



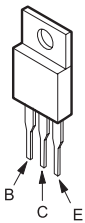
2SA1309A-QRSTA
2SC3311A-QRSTA
2SD2144S-TP-UVW



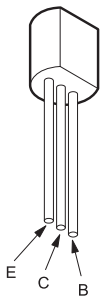
2SC3840K



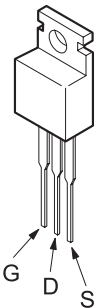
2SA1837
2SC4159-E



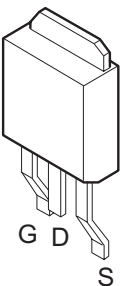
2SA1091O-TPE2



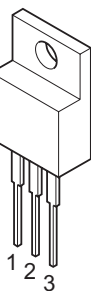
IRF614



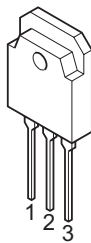
2SK2663



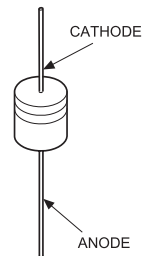
2SC4793



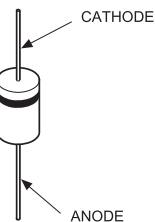
2SD2578-YB



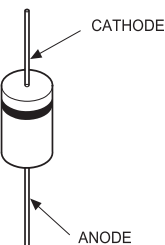
ERA38-06TP1
ERA82-004TP5
1SS133T-77
D1N20R-TA
D1NS4-TA
MTZJ-T-77-3.3
MTZJ-T-77-7.5X
MTZJ-T-77-12C
MTZJ-T-77-15B
MTZJ-T-77-33B
MTZJ-T-77-39



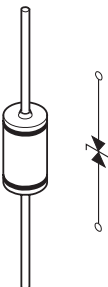
RU-1P
ERC06-15S
MTZJ-T-77-5.1C
MTZJ-T-775.6C
MTZJ-T-77-7.5A
MTZJ-T-77-10B
MTZJ-T-7730D
RGP10-GPKG3
RGP02-17PKG23
RGP15GPKG23



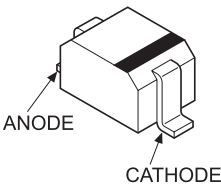
ERB44-06TP1
1SS83TD
D1NL20U-TA
EL1Z-V1
ERA22-08TP3
GP08DPKG23
RGP10GPKG23
RU4AM-T3



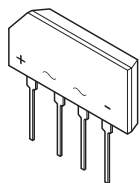
RD9.1EW-T1



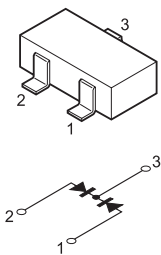
MA111-TX
UDZ-TE-17.5.1B
UDZ-TE-17.9.1B



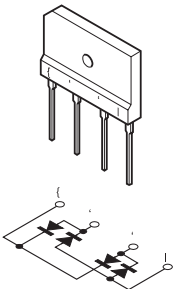
D2SB60A-F04



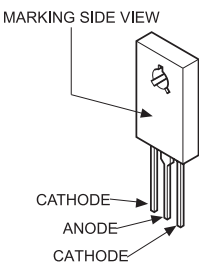
DAP202K-T-146



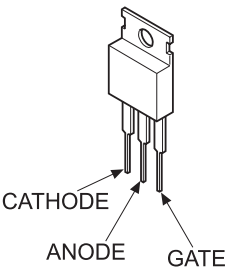
D4SB60L-F



D5LC20U



TF541M



SECTION 7

EXPLODED VIEW

- Items with no part number and no description are not stocked because they are seldom required for routine service.

- The component parts of an assembly are indicated by the reference numbers in the remarks column.

- Items marked * are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Note:

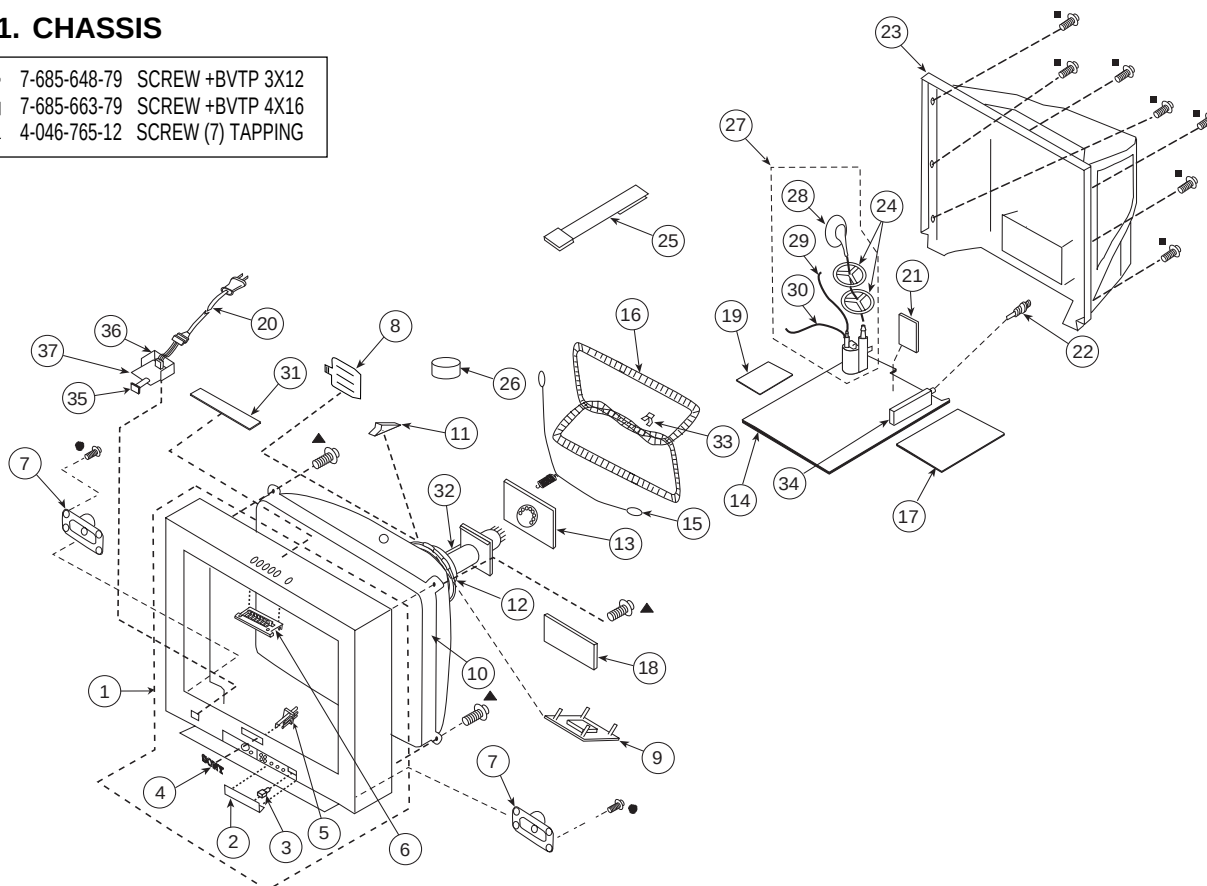
The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

7-1. CHASSIS

- 7-685-648-79 SCREW +BVTP 3X12
- 7-685-663-79 SCREW +BVTP 4X16
- ▲ 4-046-765-12 SCREW (7) TAPPING



REF.NO.	PART.NO.	DESCRIPTION	REMARK	REF.NO.	PART.NO.	DESCRIPTION	REMARK
1	X-4037-673-1	BEZNET ASSY	2-5	18	*	A-1342-550-A	VA (VAR) MOUNTED PC BOARD
2	4-075-658-01	DOOR		19	*	A-1343-875-A	D (VAR) MOUNTED PC BOARD
3	4-047-464-01	CATCHER, PUSH		20	$\triangle$	1-775-468-11	CORD, POWER (WITH CONNECTOR)
4	3-704-179-31	EMBLEM (NO.9), SONY		21	*	A-1380-632-A	K (VAR) MOUNTED PC BOARD
5	4-075-657-11	GUIDE, LED		22		1-766-374-11	PLUG, F-PIN
6	4-068-982-03	MULTI-BUTTON (TOP)		23		4-075-652-11	COVER, REAR
7	1-529-498-11	SPEAKER (13.1X6.2CM)		24		3-704-372-71	HOLDER, HV CABLE
8	2-163-920-01	PLATE, TLH CORRECTION		25		4-062-047-02	PIECE A(110), CONV CORRECT
9	1-452-896-11	COIL, NA ROTATION (RT200)		26		1-452-032-00	MAGNET, DISC
10	$\triangle$ 8-735-041-05	CRT 29RSN		27	$\triangle$	1-453-310-11	FBT ASSY NX-4521//X4J4 28-30
11	4-053-005-01	SPACER, DY		28		1-251-374-13	HV CAP ASSY
12	$\triangle$ 8-451-494-31	DY Y29RSA-S		29		1-900-800-82	FOCUS LEAD
13	*	A-1332-063-A	CA (VAR) MOUNTED PC BOARD	30		1-900-803-22	G2 LEAD
14	*	A-1299-291-A	A COMPLETE PC BOARD	31	*	A-1372-817-A	HX MOUNTED PC BOARD
The high-voltage leads associated with the FBT on this board are not included and must be ordered separately. (See 28-30)				32	$\triangle$	8-453-011-11	NA299-M
15	4-036-329-01	SPRING (B), TENSION		33	*	4-062-970-01	CLIP (29RSN), DGC
16	$\triangle$ 1-419-523-21	COIL, DEGAUSSING		34	$\triangle$	8-598-475-10	TUNER, FSS BTF-WL411
17	*	A-1304-200-A	MA (VAR) MOUNTED PC BOARD	35		4-075-661-01	BUTTON, MAIN POWER
				36	*	4-075-662-01	BRACKET, MAIN POWER
				37	*	A-1372-117-A	MOUNTED PWB, HZ



SECTION 8
ELECTRICAL PARTS LIST

Note:

The components identified by shading and mark  are critical for safety. Replace only with part number specified.

The components identified by  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

Note:

Les composants identifiés par un trame et une marque  sont critiques pour la securite. Ne les remplacer que par une piece portant le numero specifie.

- Items marked * are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

- All resistors are in ohms
- F : nonflammable

When indicating parts by reference number, please include the board name.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
A * A-1299-291-A A COMPLETE PC BOARD The high voltage leads associated with the FBT on this board are not included and must be ordered separately. Order the following leads when requesting this A Board: 1-251-374-13 HV CAP ASSY 1-900-803-22 G2 LEAD 1-900-800-82 FOCUS LEAD 1-533-223-11 HOLDER, FUSE * 4-374-846-01 COVER, CAPACITOR, CAP TYPE 4-382-854-11 SCREW (M3X10), P, SW (+)				C442	1-126-963-11	ELECT	4.7μF 20% 50V
				C496	1-216-295-11	SHORT	
				C501	1-102-114-00	CERAMIC	470PF 10% 50V
				C502	1-106-383-00	MYLAR	0.047μF 10% 200V
				C503	1-102-228-00	CERAMIC	470PF 10% 500V
				C504	1-102-228-00	CERAMIC	470PF 10% 500V
				C505 	1-162-116-00	CERAMIC	680PF 10% 2KV
				C506	1-162-318-11	CERAMIC	0.001μF 10% 500V
				C507 	1-117-717-11	FILM	17000PF 3% 1.2KV
				C508 	1-137-150-11	MYLAR	0.01μF 10% 100V
				C509 	1-162-116-00	CERAMIC	680PF 10% 2KV
				C510	1-107-649-11	ELECT	2.2μF 20% 250V
				C511 	1-115-522-11	FILM	1μF 5% 250V
				C512 	1-106-387-00	MYLAR	0.068μF 10% 200V
				C513	1-104-987-11	MYLAR	0.001μF 10% 100V
				C514	1-109-844-11	FILM	0.68μF 5% 250V
				C515 	1-162-116-00	CERAMIC	680PF 10% 2KV
				C520 	1-129-722-00	FILM	0.047μF 5% 630V
				C521	1-164-646-11	CERAMIC	2200PF 10% 500V
				C523	1-126-941-11	ELECT	470μF 20% 25V
				C524	1-102-244-00	CERAMIC	220PF 10% 500V
				C525	1-107-612-11	CERAMIC	100PF 5% 500V
				C526	1-126-960-11	ELECT	1μF 20% 50V
				C527	1-126-965-11	ELECT	22μF 20% 50V
				C528	1-164-161-11	CERAMIC CHIP	0.0022μF 10% 50V
				C529	1-164-161-11	CERAMIC CHIP	0.0022μF 10% 50V
				C530	1-164-161-11	CERAMIC CHIP	0.0022μF 10% 50V
				C531	1-106-387-00	MYLAR	0.068μF 10% 200V
				C533	1-126-941-11	ELECT	470μF 20% 25V
				C534 	1-126-964-11	ELECT	10μF 20% 50V
				C535	1-126-959-11	ELECT	0.47μF 20% 50V
				C536	1-102-228-00	CERAMIC	470PF 10% 500V
				C537 	1-126-965-11	ELECT	22μF 20% 50V
				C539	1-107-662-11	ELECT	22μF 20% 250V
				C540	1-107-645-11	ELECT	22μF 20% 160V
				C541	1-126-969-11	ELECT	220μF 20% 50V
				C542	1-126-967-11	ELECT	47μF 20% 50V
				C543	1-136-169-00	FILM	0.22μF 5% 50V
				C546 	1-126-965-11	ELECT	22μF 20% 50V
C100	1-216-295-11	SHORT					
C101	1-216-295-11	SHORT					
C102	1-126-933-11	ELECT	100μF 20% 16V				
C104	1-126-941-11	ELECT	470μF 20% 25V				
C105	1-104-664-11	ELECT	47μF 20% 25V				
C204	1-163-017-00	CERAMIC CHIP	0.0047μF 10% 50V				
C205	1-126-963-11	ELECT	4.7μF 20% 50V				
C207	1-126-961-11	ELECT	2.2μF 20% 50V				
C208	1-126-961-11	ELECT	2.2μF 20% 50V				
C210	1-126-963-11	ELECT	4.7μF 20% 50V				
C214	1-164-346-11	CERAMIC CHIP	1μF 16V				
C215	1-164-346-11	CERAMIC CHIP	1μF 16V				
C216	1-126-963-11	ELECT	4.7μF 20% 50V				
C219	1-126-964-11	ELECT	10μF 20% 50V				
C401	1-126-968-11	ELECT	100μF 20% 50V				
C402	1-126-943-11	ELECT	2200μF 20% 25V				
C403	1-126-957-11	ELECT	0.22μF 20% 50V				
C420	1-164-222-11	CERAMIC CHIP	0.22μF 25V				
C421	1-164-222-11	CERAMIC CHIP	0.22μF 25V				
C435	1-164-222-11	CERAMIC CHIP	0.22μF 25V				
C441	1-164-346-11	CERAMIC CHIP	1μF 16V				

**Note:**

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la securite. Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
D507	8-719-991-33	DIODE 1SS133T-77		FUSE			
D508	8-719-991-33	DIODE 1SS133T-77		F601	$\triangle$ 1-532-506-51	FUSE 6.3A/250V	
D509	8-719-109-89	DIODE MTZJ-T-77-5.6C		FERRITE BEAD			
D510	8-719-908-03	DIODE GP08DPKG23		FB501	1-410-397-21	FERRITE	1.1 μ H
D511	8-719-302-43	DIODE RGP10GPKG23		FB502	1-410-397-21	FERRITE	1.1 μ H
D512	8-719-073-01	DIODE MA111-TX		FB503	1-410-397-21	FERRITE	1.1 μ H
D513	8-719-979-85	DIODE RGP15GPKG23		FB600	1-412-911-11	FERRITE	0 μ H
D514	8-719-979-85	DIODE RGP15GPKG23		FB601	1-412-911-11	FERRITE	0 μ H
D515	8-719-073-01	DIODE MA111-TX		FB602	1-412-911-11	FERRITE	0 μ H
D516	$\triangle$ 8-719-991-33	DIODE 1SS133T-77		FB603	1-412-911-11	FERRITE	0 μ H
D517	$\triangle$ 8-719-991-33	DIODE 1SS133T-77		FB604	1-412-911-11	FERRITE	0 μ H
D518	$\triangle$ 8-719-921-63	DIODE MTZJ-T-77-7.5X		FB605	1-412-911-11	FERRITE	0 μ H
D519	$\triangle$ 8-719-302-43	DIODE EL1Z-V1		FB606	1-412-911-11	FERRITE	0 μ H
D520	$\triangle$ 8-719-073-01	DIODE MA111-TX		FB609	1-412-911-11	FERRITE	0 μ H
D521	8-719-991-33	DIODE 1SS133T-77		FB610	1-412-911-11	FERRITE	0 μ H
D522	8-719-073-01	DIODE MA111-TX		IC			
D601	8-719-991-33	DIODE 1SS133T-77		IC401	$\triangle$ 8-759-490-17	IC TDA7057AQ/N2	
D602	8-719-991-33	DIODE 1SS133T-77		IC501	$\triangle$ 8-759-700-07	IC NJM2903M-TE2	
D603	8-719-982-26	DIODE MTZJ-T-77-33B		IC502	8-759-980-58	IC TDA8172	
D604	8-719-028-72	DIODE RGP02-17PKG23		IC601	$\triangle$ 8-749-014-48	IC STR-F6656	
D605	$\triangle$ 8-719-510-53	DIODE D4SB60L-F		IC602	$\triangle$ 8-749-016-47	IC EA135-F12	
D606	$\triangle$ 8-719-108-18	DIODE TF541M		IC603	8-759-198-03	IC PQ09RF21	
D607	8-719-991-33	DIODE 1SS133T-77		IC604	8-759-701-75	IC NJM7805FA	
D608	8-719-110-53	DIODE MTZJ-T-77-20B		IC2001	8-742-212-20	HYB IC SBX3081-71	
D609	8-719-311-31	DIODE RU-1P		JACK			
D610	8-719-510-02	DIODE D1NS4-TA		J201	1-794-119-11	TERMINAL BLOCK, S 4P	
D611	8-719-063-70	DIODE D1NL20U-TA		J202	1-794-267-11	JACK, PIN 3P	
D612	8-719-110-17	DIODE MTZJ-T-77-10B		J203	1-794-118-11	JACK BLOCK, PIN 3P	
D613	8-719-063-70	DIODE D1NL20U-TA		J205	1-794-116-11	JACK BLOCK, PIN 2P	
D614	8-719-063-70	DIODE D1NL20U-TA		J206	1-794-117-11	JACK BLOCK, PIN 3P	
D615	8-719-312-10	DIODE RU4AM-T3		J402	1-794-116-11	JACK BLOCK, PIN 2P	
D616	8-719-510-37	DIODE D5LC20U		CHIP CONDUCTOR			
D617	8-719-110-31	DIODE MTZJ-T-77-12C		JR001	1-216-295-11	SHORT	
D618	8-719-991-33	DIODE 1SS133T-77		JR002	1-216-295-11	SHORT	
D619	8-719-110-17	DIODE MTZJ-T-77-10B		JR402	1-216-295-11	SHORT	
D620	8-719-510-37	DIODE D5LC20U		JR403	1-216-295-11	SHORT	
D622	8-719-077-76	DIODE D2SB60A-F04		JR405	1-216-295-11	SHORT	
D623	8-719-948-45	DIODE ERA22-08TP3		JR411	1-216-295-11	SHORT	
D624	8-719-991-33	DIODE 1SS133T-77		JR472	1-216-295-11	SHORT	
D625	8-719-991-33	DIODE 1SS133T-77		JR502	1-216-295-11	SHORT	
D626	8-719-063-70	DIODE D1NL20U-TA		JR503	1-216-295-11	SHORT	
D627	8-719-110-03	DIODE MTZJ-T-77-7.5A		JR505	1-216-295-11	SHORT	
D628	8-719-510-48	DIODE D1N20R-TA		JR522	1-216-295-11	SHORT	
D2001	8-719-070-79	DIODE LNK0220022G1					
D2002	8-719-110-17	DIODE MTZJ-T-77-10B					
D2003	8-719-108-12	DIODE RD9.1EW-T1					
D2004	8-719-921-44	DIODE MTZJ-T-77-5.1C					
D2005	8-719-921-44	DIODE MTZJ-T-77-5.1C					

Note:

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

A

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
JR523	1-216-295-11	SHORT		RESISTOR			
JR526	1-216-295-11	SHORT		R105	1-208-798-11	METAL CHIP	4.7K 0.50% 1/10W
JR527	1-216-295-11	SHORT		R107	1-216-025-11	RES-CHIP	100 5% 1/10W
				R108	1-216-025-11	RES-CHIP	100 5% 1/10W
				R115	1-216-295-11	SHORT	
				R201	1-216-113-00	RES-CHIP	470K 5% 1/10W
COIL				R202	1-216-113-00	RES-CHIP	470K 5% 1/10W
L101	1-412-029-11	INDUCTOR CHIP	10 μ H	R203	1-216-022-00	RES-CHIP	75 5% 1/10W
L102	1-412-032-11	INDUCTOR CHIP	100 μ H	R204	1-216-081-00	RES-CHIP	22K 5% 1/10W
L103	1-412-029-11	INDUCTOR CHIP	10 μ H	R205	1-216-085-00	RES-CHIP	33K 5% 1/10W
L501	1-409-955-11	INDUCTOR	8mH	R208	1-215-924-00	METAL OXIDE	15K 5% 3W
L502	1-412-552-11	INDUCTOR	2.2mH				
L503	1-406-677-11	INDUCTOR	10mH	R211	1-216-022-00	RES-CHIP	75 5% 1/10W
L504	1-412-533-21	INDUCTOR	47 μ H	R214	1-216-113-00	RES-CHIP	470K 5% 1/10W
L505	1-406-978-11	INDUCTOR	150 μ H	R215	1-216-113-00	RES-CHIP	470K 5% 1/10W
L506	1-406-677-11	INDUCTOR	10mH	R235	1-216-113-00	RES-CHIP	470K 5% 1/10W
L507	1-412-552-11	INDUCTOR	2.2mH	R237	1-216-033-00	RES-CHIP	220 5% 1/10W
L510 $\triangle$	1-412-528-11	INDUCTOR	18 μ H	R238	1-216-033-00	RES-CHIP	220 5% 1/10W
L603	1-412-529-11	INDUCTOR	22 μ H	R239	1-216-113-00	RES-CHIP	470K 5% 1/10W
L604	1-412-525-31	INDUCTOR	10 μ H	R401	1-216-080-00	RES-CHIP	20K 5% 1/10W
L605	1-412-529-11	INDUCTOR	22 μ H	R402	1-216-073-00	RES-CHIP	10K 5% 1/10W
				R411	1-249-417-11	CARBON	1K 5% 1/4W
PHOTO COUPLER				R412	1-216-113-00	RES-CHIP	470K 5% 1/10W
PH601 $\triangle$	8-749-010-64	PHOTO COUPLER PC123FY2		R413	1-216-113-00	RES-CHIP	470K 5% 1/10W
				R414	1-249-417-11	CARBON	1K 5% 1/4W
				R420	1-208-796-11	METAL CHIP	3.9K 0.50% 1/10W
				R421	1-249-425-11	CARBON	4.7K 5% 1/4W
IC LINK				R422	1-249-389-11	CARBON	4.7 5% 1/4W
PS401 $\triangle$	1-576-336-21	LINK, IC		R426	1-216-009-91	RES-CHIP	22 5% 1/10W
				R429	1-216-113-00	RES-CHIP	470K 5% 1/10W
				R430	1-216-049-11	RES-CHIP	1K 5% 1/10W
				R431	1-216-049-11	RES-CHIP	1K 5% 1/10W
TRANSISTOR				R433	1-216-113-00	RES-CHIP	470K 5% 1/10W
Q101	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R436	1-216-073-00	RES-CHIP	10K 5% 1/10W
Q410	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R437	1-216-073-00	RES-CHIP	10K 5% 1/10W
Q411	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX		R438	1-216-073-00	RES-CHIP	10K 5% 1/10W
Q501	8-729-140-50	TRANSISTOR 2SC3209LK-TP		R439	1-216-073-00	RES-CHIP	10K 5% 1/10W
Q502 $\triangle$	8-729-046-07	TRANSISTOR 2SD2578-YB					
Q503 $\triangle$	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R440	1-216-097-11	RES-CHIP	100K 5% 1/10W
Q504 $\triangle$	8-729-809-29	TRANSISTOR 2SC4159-E		R441	1-216-081-00	RES-CHIP	22K 5% 1/10W
Q505 $\triangle$	8-729-200-17	TRANSISTOR 2SA1091O-TPE2		R442	1-208-758-11	METAL CHIP	100 0.50% 1/10W
Q506 $\triangle$	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R445	1-216-073-00	RES-CHIP	10K 5% 1/10W
Q507 $\triangle$	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX		R446	1-215-457-00	METAL	33K 1% 1/4W
Q601	8-729-922-37	TRANSISTOR 2SD2144S-TP-UVW		R447	1-216-065-91	RES-CHIP	4.7K 5% 1/10W
Q602	8-729-423-33	TRANSISTOR 2SC3311A-QRSTA		R454	1-216-025-11	RES-CHIP	100 5% 1/10W
Q603 $\triangle$	8-729-119-76	TRANSISTOR 2SA1309A-QRSTA		R501	1-249-425-11	CARBON	4.7K 5% 1/4W
Q604	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R502 $\triangle$	1-216-455-21	METAL OXIDE	560 5% 2W
Q605 $\triangle$	8-729-046-40	TRANSISTOR 2SK2663		R503 $\triangle$	1-249-425-11	CARBON	4.7K 5% 1/4W
Q606	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX					
Q607	8-729-922-37	TRANSISTOR 2SD2144S-TP-UVW		R505	1-249-401-11	CARBON	47 5% 1/4W
Q608	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R506 $\triangle$	1-215-883-11	METAL OXIDE	33 5% 2W
Q609	8-729-423-33	TRANSISTOR 2SC3311A-QRSTA		R507 $\triangle$	1-260-328-11	CARBON	1K 5% 1/2W

A

Note:

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

REF.NO.	PART NO.	DESCRIPTION	REMARK			REF.NO.	PART NO.	DESCRIPTION	REMARK		
R508	1-249-433-11	CARBON	22K	5%	1/4W	R563	$\triangle$ 1-249-433-11	CARBON	22K	5%	1/4W
R509	$\triangle$ 1-215-891-11	METAL OXIDE	680	5%	2W	$\blacktriangleright$ R564	$\triangle$ 1-208-836-11	METAL CHIP	180K	0.50%	1/10W
R510	1-249-411-11	CARBON	330	5%	1/4W	R565	$\triangle$ 1-249-429-11	CARBON	10K	5%	1/4W
R511	1-249-377-11	CARBON	0.47	5%	1/4W	R566	$\triangle$ 1-216-073-00	RES-CHIP	10K	5%	1/10W
R512	1-215-910-00	METAL OXIDE	68	5%	3W	R567	$\triangle$ 1-216-073-00	RES-CHIP	10K	5%	1/10W
R513	$\triangle$ 1-215-907-11	METAL OXIDE	22	5%	3W	R568	$\triangle$ 1-215-882-00	METAL OXIDE	22	5%	2W
R514	1-216-683-11	METAL CHIP	22K	0.50%	1/10W	R569	1-214-798-21	METAL	1.8	1%	1/2W
R516	1-249-425-11	CARBON	4.7K	5%	1/4W	R570	1-249-433-11	CARBON	22K	5%	1/4W
R517	1-215-445-00	METAL	10K	1%	1/4W	R571	1-216-065-91	RES-CHIP	4.7K	5%	1/10W
R518	1-249-427-11	CARBON	6.8K	5%	1/4W	R572	1-216-065-91	RES-CHIP	4.7K	5%	1/10W
R519	1-249-427-11	CARBON	6.8K	5%	1/4W	R602	$\triangle$ 1-249-389-11	CARBON	4.7	5%	1/4W
R520	$\triangle$ 1-215-884-11	METAL OXIDE	47	5%	2W	R603	1-215-485-00	METAL	470K	1%	1/4W
R521	$\triangle$ 1-249-413-11	CARBON	470	5%	1/4W	R607	1-215-859-00	METAL OXIDE	22	5%	1W
R522	1-249-417-11	CARBON	1K	5%	1/4W	R608	1-240-205-11	CARBON	22M	5%	1/2W
R523	1-216-073-00	RES-CHIP	10K	5%	1/10W	R609	1-216-049-11	RES-CHIP	1K	5%	1/10W
R524	1-249-429-11	CARBON	10K	5%	1/4W	R610	1-216-073-00	RES-CHIP	10K	5%	1/10W
R525	$\triangle$ 1-208-804-11	METAL CHIP	8.2K	0.50%	1/10W	R611	1-216-089-11	RES-CHIP	47K	5%	1/10W
R526	1-208-814-91	METAL CHIP	22K	0.50%	1/10W	R612	1-216-045-00	RES-CHIP	680	5%	1/10W
R528	1-215-429-00	METAL	2.2K	1%	1/4W	R613	$\triangle$ 1-219-512-11	CARBON	2.2M	5%	1/2W
R529	1-216-109-00	RES-CHIP	330K	5%	1/10W	R614	1-249-413-11	CARBON	470	5%	1/4W
R530	1-216-077-91	RES-CHIP	15K	5%	1/10W	R615	$\triangle$ 1-218-265-11	METAL	8.2M	5%	1W
R532	1-215-437-00	METAL	4.7K	1%	1/4W	R616	$\triangle$ 1-260-302-51	CARBON	6.8	5%	1/2W
R533	1-215-457-00	METAL	33K	1%	1/4W	R617	1-216-009-91	RES-CHIP	22	5%	1/10W
R534	1-215-458-00	METAL	36K	1%	1/4W	R618	1-249-440-11	CARBON	82K	5%	1/4W
R535	1-249-441-11	CARBON	100K	5%	1/4W	R619	1-249-437-11	CARBON	47K	5%	1/4W
R536	$\triangle$ 1-214-798-21	METAL	1.8	1%	1/2W	R620	1-249-417-11	CARBON	1K	5%	1/4W
R538	$\triangle$ 1-215-889-00	METAL OXIDE	330	5%	2W	R621	$\triangle$ 1-240-251-11	CEMENTED	6.8	5%	10W
R539	$\triangle$ 1-249-385-11	CARBON	2.2	5%	1/4W	R622	1-249-441-11	CARBON	100K	5%	1/4W
R540	1-215-445-00	METAL	10K	1%	1/4W	R623	$\triangle$ 1-260-324-11	CARBON	470	5%	1/2W
R541	1-249-429-11	CARBON	10K	5%	1/4W	R624	$\triangle$ 1-249-429-11	CARBON	10K	5%	1/4W
R543	1-247-887-00	CARBON	220K	5%	1/4W	R625	1-249-437-11	CARBON	47K	5%	1/4W
R544	$\triangle$ 1-249-377-11	CARBON	0.47	5%	1/4W	R626	$\triangle$ 1-220-926-11	FUSIBLE	0.47	10%	1/2W
R545	1-215-873-00	METAL OXIDE	4.7K	5%	1W	R627	1-215-479-00	METAL	270K	1%	1/4W
R546	$\triangle$ 1-249-377-11	CARBON	0.47	5%	1/4W	R628	1-215-479-00	METAL	270K	1%	1/4W
R547	1-216-455-21	METAL OXIDE	560	5%	2W	R630	1-249-421-11	CARBON	2.2K	5%	1/4W
R548	1-216-377-11	METAL OXIDE	4.7	5%	2W	R631	1-215-929-11	METAL OXIDE	100K	5%	3W
R549	$\triangle$ 1-260-288-11	CARBON	0.47	5%	1/2W	R632	$\triangle$ 1-216-361-21	METAL OXIDE	0.22	5%	2W
R550	$\triangle$ 1-260-288-11	CARBON	0.47	5%	1/2W	R633	1-249-415-11	CARBON	680	5%	1/4W
R551	1-215-907-11	METAL OXIDE	22	5%	3W	R634	1-216-073-00	RES-CHIP	10K	5%	1/10W
R553	$\triangle$ 1-216-363-00	METAL OXIDE	0.33	5%	2W	R635	1-216-057-00	RES-CHIP	2.2K	5%	1/10W
R554	$\triangle$ 1-249-429-11	CARBON	10K	5%	1/4W	R637	$\triangle$ 1-216-485-11	METAL OXIDE	5.6K	5%	3W
R555	$\triangle$ 1-247-895-91	CARBON	470K	5%	1/4W	R638	1-249-402-11	CARBON	56	5%	1/4W
R556	$\triangle$ 1-249-417-11	CARBON	1K	5%	1/4W	R639	1-249-421-11	CARBON	2.2K	5%	1/4W
R557	$\triangle$ 1-247-895-91	CARBON	470K	5%	1/4W	R640	1-249-417-11	CARBON	1K	5%	1/4W
R558	$\triangle$ 1-216-097-11	RES-CHIP	100K	5%	1/10W	R641	$\triangle$ 1-216-362-11	METAL OXIDE	0.27	5%	2W
R559	$\triangle$ 1-216-073-00	RES-CHIP	10K	5%	1/10W	R642	1-216-089-11	RES-CHIP	47K	5%	1/10W
R560	$\triangle$ 1-215-902-11	METAL OXIDE	47K	5%	1W	R643	1-249-419-11	CARBON	1.5K	5%	1/4W
R561	$\triangle$ 1-249-406-11	CARBON	120	5%	1/4W	R644	1-247-843-11	CARBON	3.3K	5%	1/4W
R562	$\triangle$ 1-208-808-11	METAL CHIP	12K	0.50%	1/10W	R645	1-215-898-11	METAL OXIDE	10K	5%	2W

Note:

The components identified by shading and mark  are critical for safety. Replace only with part number specified.

Note:

The components identified by  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding x-ray radiation. Should replacement be required, replace only with the value originally used.



REF.NO.	PART NO.	DESCRIPTION	REMARK		
R646	1-249-419-11	CARBON	1.5K	5%	1/4W
R648	1-215-908-00	METAL OXIDE	33	5%	3W
R649	1-249-417-11	CARBON	1K	5%	1/4W
R650	1-216-387-11	METAL OXIDE	0.68	5%	3W
R651	1-249-429-11	CARBON	10K	5%	1/4W
R653	1-216-049-11	RES-CHIP	1K	5%	1/10W
R655	1-216-049-11	RES-CHIP	1K	5%	1/10W
R656	1-249-429-11	CARBON	10K	5%	1/4W
R658	1-216-387-11	METAL OXIDE	0.68	5%	3W
R659	1-215-857-11	METAL OXIDE	10	5%	1W
R660	△ 1-216-485-11	METAL OXIDE	5.6K	5%	3W
R661	1-216-057-00	RES-CHIP	2.2K	5%	1/10W
R662	△ 1-216-485-11	METAL OXIDE	5.6K	5%	3W
R663	1-216-081-00	RES-CHIP	22K	5%	1/10W
R2001	1-216-057-00	RES-CHIP	2.2K	5%	1/10W
R2002	1-216-053-00	RES-CHIP	1.5K	5%	1/10W
R2003	1-249-425-11	CARBON	4.7K	5%	1/4W
R2004	1-216-069-00	RES-CHIP	6.8K	5%	1/10W
R2006	1-216-295-11	SHORT			
R2007	1-249-413-11	CARBON	470	5%	1/4W
RELAY					
RY601	△ 1-755-198-11	RELAY			
RY602	△ 1-755-266-11	RELAY, AC POWER			
SWITCH					
S2007	1-762-816-11	SWITCH, TACTILE			
S2008	1-762-816-11	SWITCH, TACTILE			
SWITCH					
SW501	1-572-707-11	SWITCH, LEVER			
SW502	1-572-707-11	SWITCH, LEVER			
TRANSFORMER					
T501	△ 1-437-195-11	TRANSFORMER, HORIZONTAL DRIVE			
T503	△ 1-426-981-11	TRANSFORMER, FERRITE (PMT)			
T504	△ 1-431-693-11	TRANSFORMER, HORIZONTAL LINEAR			
T505	△ 1-453-310-11	FBT ASSY NX-4521I/X4J4			
T601	1-433-900-11	TRANSFORMER, LINE FILTER			
T602	△ 1-433-900-11	TRANSFORMER, LINE FILTER			
T603	△ 1-433-807-11	TRANSFORMER, REGULAT			
T604	△ 1-431-852-11	TRANSFORMER, CONVERTER (SRT)			
THERMISTOR					
TH501	1-800-193-00	THERMISTOR			

REF.NO. PART NO. DESCRIPTION REMARK

TH601 △ 1-803-586-11 THERMISTOR, NTC

THERMISTOR

THP601 △ 1-803-540-11 THERMISTOR

TUNER

TU101 △ 8-598-475-10 TUNER, FSS BTF-WL411

VARISTOR

VDR601 △ 1-803-967-11 VARISTOR (ENE621D-14A)

CA

* A-1332-063-A CA (VAR) MOUNTED PC BOARD

4-382-854-11 SCREW (M3X10), P, SW (+)

CAPACITOR

C701 1-104-664-11 ELECT 47μF 20% 25V

C702 1-136-165-00 FILM 0.1μF 5% 50V

C703 1-104-664-11 ELECT 47μF 20% 25V

C704 1-107-651-11 ELECT 4.7μF 20% 250V

C705 1-107-652-11 ELECT 10μF 20% 250V

C707 1-162-114-00 CERAMIC 0.0047μF 2KV

C708 1-136-165-00 FILM 0.1μF 5% 50V

C709 1-126-934-11 ELECT 220μF 20% 16V

C710 1-126-964-11 ELECT 10μF 20% 50V

CONNECTOR

CN701 * 1-564-506-11 PLUG, CONNECTOR 3P

CN702 1-695-915-11 TAB (CONTACT)

CN704 1-695-915-11 TAB (CONTACT)

CN706 * 1-564-509-11 PLUG, CONNECTOR 6P

DIODE

D701 8-719-901-83 DIODE 1SS83TD

D702 8-719-901-83 DIODE 1SS83TD

D703 8-719-901-83 DIODE 1SS83TD

D704 8-719-302-43 DIODE RGP10GPKG23

**Note:**

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
<u>IC</u>				D			
IC701	8-759-803-42	IC LA6500-FA					
IC702	8-759-562-43	IC TDA6108JF/N1B					
<u>JACK</u>							
J701	△ 1-451-470-21	SOCKET, CRT					
<u>COIL</u>							
L701	1-408-613-31	INDUCTOR	68μH				
<u>TRANSISTOR</u>							
Q700	8-729-423-33	TRANSISTOR 2SC3311A-QRSTA					
Q701	8-729-423-33	TRANSISTOR 2SC3311A-QRSTA					
<u>RESISTOR</u>							
R700	1-249-433-11	CARBON	22K	5%	1/4W		
R701	1-249-429-11	CARBON	10K	5%	1/4W		
R702	1-249-409-11	CARBON	220	5%	1/4W		
R703	1-247-807-31	CARBON	100	5%	1/4W		
R704	1-249-421-11	CARBON	2.2K	5%	1/4W		
R705	1-249-429-11	CARBON	10K	5%	1/4W		
R706	1-249-381-11	CARBON	1	5%	1/4W		
R707	1-249-383-11	CARBON	1.5	5%	1/4W		
R708	1-247-807-31	CARBON	100	5%	1/4W		
R709	1-247-807-31	CARBON	100	5%	1/4W		
R710	1-247-807-31	CARBON	100	5%	1/4W		
R711	1-260-099-11	CARBON	1K	5%	1/2W		
R712	1-260-099-11	CARBON	1K	5%	1/2W		
R713	1-260-099-11	CARBON	1K	5%	1/2W		
R714	1-260-087-11	CARBON	100	5%	1/2W		
R715	1-260-132-11	CARBON	560K	5%	1/2W		
R716	1-260-123-11	CARBON	100K	5%	1/2W		
R717	1-216-373-11	METAL OXIDE	2.2	5%	2W		
R719	1-215-888-00	METAL OXIDE	220	5%	2W		
R720	1-249-421-11	CARBON	2.2K	5%	1/4W		
R721	1-249-421-11	CARBON	2.2K	5%	1/4W		
<u>VARIABLE RESISTOR</u>							
RV701	1-241-656-11	RES, ADJ, METAL FILM 110M					

Note:

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

D

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
IC				R827	1-216-065-91	RES-CHIP	4.7K 5% 1/10W
IC801	8-759-700-42	IC NJM2904D		R828	1-216-085-00	RES-CHIP	33K 5% 1/10W
IC802	8-759-659-67	IC NJM2903D		R829	1-208-846-11	METAL CHIP	470K 0.50% 1/10W
IC803	8-759-659-67	IC NJM2903D		R830	1-216-295-11	SHORT	
CHIP CONDUCTOR				R831	1-216-049-11	RES-CHIP	1K 5% 1/10W
JR801	1-216-295-11	SHORT		R832	1-216-067-00	RES-CHIP	5.6K 5% 1/10W
COIL				R833	1-216-687-11	METAL CHIP	33K 0.50% 1/10W
L803	1-406-677-11	INDUCTOR	10mH	R834	1-216-065-91	RES-CHIP	4.7K 5% 1/10W
TRANSISTOR				R835	1-216-057-00	RES-CHIP	2.2K 5% 1/10W
Q801	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R836	1-216-057-00	RES-CHIP	2.2K 5% 1/10W
Q802	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX		R837	1-208-808-11	METAL CHIP	12K 0.50% 1/10W
Q803	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX		R838	1-247-807-31	CARBON	100 5% 1/4W
Q804	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX		R839	1-216-025-11	RES-CHIP	100 5% 1/10W
Q805	8-729-140-97	TRANSISTOR 2SB734-T-34		R840	1-216-093-91	RES-CHIP	68K 5% 1/10W
Q806	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R841	1-208-802-11	METAL CHIP	6.8K 0.50% 1/10W
Q809	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX		R842	1-208-796-11	METAL CHIP	3.9K 0.50% 1/10W
Q810	8-729-043-95	TRANSISTOR 2SC3840K		R845	1-249-441-11	CARBON	100K 5% 1/4W
Q811	8-729-119-76	TRANSISTOR 2SA1309A-QRSTA		R846	1-249-441-11	CARBON	100K 5% 1/4W
Q812	8-729-119-76	TRANSISTOR 2SA1309A-QRSTA		R847	1-249-441-11	CARBON	100K 5% 1/4W
RESISTOR				R848	1-215-876-00	METAL OXIDE	15K 5% 1W
R801	1-216-089-11	RES-CHIP	47K 5% 1/10W	R849	1-215-920-11	METAL OXIDE	3.3K 5% 3W
R802	1-216-073-00	RES-CHIP	10K 5% 1/10W	R851	1-215-894-11	METAL OXIDE	2.2K 5% 2W
R803	1-216-081-00	RES-CHIP	22K 5% 1/10W	R854	1-216-069-00	RES-CHIP	6.8K 5% 1/10W
R804	1-216-073-00	RES-CHIP	10K 5% 1/10W	R855	1-216-089-11	RES-CHIP	47K 5% 1/10W
R805	1-216-065-91	RES-CHIP	4.7K 5% 1/10W	R860	1-208-806-11	METAL CHIP	10K 0.50% 1/10W
R806	1-216-081-00	RES-CHIP	22K 5% 1/10W	R862	1-216-057-00	RES-CHIP	2.2K 5% 1/10W
R807	1-216-061-00	RES-CHIP	3.3K 5% 1/10W	R863	1-216-057-00	RES-CHIP	2.2K 5% 1/10W
R808	1-216-073-00	RES-CHIP	10K 5% 1/10W	R864	1-216-033-00	RES-CHIP	220 5% 1/10W
R809	1-216-081-00	RES-CHIP	22K 5% 1/10W	R865	1-216-097-11	RES-CHIP	100K 5% 1/10W
R811	1-216-025-11	RES-CHIP	100 5% 1/10W	R866	1-249-429-11	CARBON	10K 5% 1/4W
R812	1-216-061-00	RES-CHIP	3.3K 5% 1/10W	R867	1-216-073-00	RES-CHIP	10K 5% 1/10W
R813	1-216-041-00	RES-CHIP	470 5% 1/10W	R868	1-216-073-00	RES-CHIP	10K 5% 1/10W
R815	1-215-862-11	METAL OXIDE	68 5% 1W	R869	1-216-097-11	RES-CHIP	100K 5% 1/10W
R816	1-247-807-31	CARBON	100 5% 1/4W	R870	1-216-057-00	RES-CHIP	2.2K 5% 1/10W
R817	1-216-091-00	RES-CHIP	56K 5% 1/10W	R871	1-215-489-00	METAL	680K 1% 1/4W
R819	1-216-089-11	RES-CHIP	47K 5% 1/10W	R872	1-216-121-11	RES-CHIP	1M 5% 1/10W
R820	1-216-683-11	METAL CHIP	22K 0.50% 1/10W	R873	1-216-073-00	RES-CHIP	10K 5% 1/10W
R821	1-216-077-91	RES-CHIP	15K 5% 1/10W	R874	1-216-037-00	RES-CHIP	330 5% 1/10W
R822	1-216-065-91	RES-CHIP	4.7K 5% 1/10W	R875	1-216-035-00	RES-CHIP	270 5% 1/10W
R823	1-216-065-91	RES-CHIP	4.7K 5% 1/10W	TRANSFORMER			
R824	1-208-830-11	METAL CHIP	100K 0.50% 1/10W	T801	1-424-584-11	TRANSFORMER, DYNAMIC FOCUS	
R825	1-208-830-11	METAL CHIP	100K 0.50% 1/10W				



Note:
The components identified by shading and mark  are critical for safety. Replace only with part number specified.

Note:
Les composants identifiés par un trame et une marque  sont critiques pour la securite. Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
HX				K			
* A-1372-817-A HX MOUNTED PC BOARD				* A-1380-632-A K (VAR) MOUNTED PC BOARD			
CONNECTOR				CAPACITOR			
CN4001*	1-564-518-11	PLUG, CONNECTOR 3P		C201	1-126-963-11	ELECT	4.7µF 20.00% 50V
RESISTOR				C202	1-126-963-11	ELECT	4.7µF 20.00% 50V
R4001	1-216-025-11	RES-CHIP	100 5% 1/10W	C404	1-164-182-11	CERAMIC CHIP	0.0033µF 10.00% 50V
R4002	1-216-045-00	RES-CHIP	680 5% 1/10W	C405	1-163-034-00	CERAMIC CHIP	0.033µF 50V
R4003	1-216-047-91	RES-CHIP	820 5% 1/10W	C406	1-163-011-11	CERAMIC CHIP	0.0015µF 10.00% 50V
R4004	1-216-057-00	RES-CHIP	2.2K 5% 1/10W	C407	1-164-222-11	CERAMIC CHIP	0.22µF 25V
R4005	1-216-069-00	RES-CHIP	6.8K 5% 1/10W	C408	1-164-222-11	CERAMIC CHIP	0.22µF 25V
SWITCH				C409	1-163-011-11	CERAMIC CHIP	0.0015µF 10.00% 50V
S4001	1-762-196-21	SWITCH,TACTILE		C410	1-163-034-00	CERAMIC CHIP	0.033µF 50V
S4002	1-762-196-21	SWITCH,TACTILE		C411	1-164-182-11	CERAMIC CHIP	0.0033µF 10.00% 50V
S4003	1-762-196-21	SWITCH,TACTILE		C412	1-163-038-11	CERAMIC CHIP	0.1µF 25V
S4004	1-762-196-21	SWITCH,TACTILE		C413	1-126-963-11	ELECT	4.7µF 20.00% 50V
S4005	1-762-196-21	SWITCH,TACTILE		C414	1-126-963-11	ELECT	4.7µF 20.00% 50V
S4006	1-762-196-21	SWITCH,TACTILE		C415	1-126-963-11	ELECT	4.7µF 20.00% 50V
HZ				C416	1-126-963-11	ELECT	4.7µF 20.00% 50V
* A-1372-117-A MOUNTED PWB, HZ				C417	1-126-963-11	ELECT	4.7µF 20.00% 50V
CONNECTOR				C418	1-163-038-11	CERAMIC CHIP	0.1µF 25V
CN901 *	1-580-843-11	PIN, CONNECTOR (POWER)		C419	1-164-346-11	CERAMIC CHIP	1µF 16V
CN902 *	1-580-843-11	PIN, CONNECTOR (POWER)		C422	1-126-963-11	ELECT	4.7µF 20.00% 50V
SWITCH				C423	1-126-963-11	ELECT	4.7µF 20.00% 50V
S901 	1-571-433-21	SWITCH, PUSH (AC POWER)		C440	1-163-038-11	CERAMIC CHIP	0.1µF 25V
				C441	1-126-933-11	ELECT	100µF 20.00% 16V
				C446	1-126-933-11	ELECT	100µF 20.00% 16V
				C450	1-126-963-11	ELECT	4.7µF 20.00% 50V
				C451	1-126-963-11	ELECT	4.7µF 20.00% 50V
				C475	1-163-038-11	CERAMIC CHIP	0.1µF 25V
				C490	1-216-295-11	SHORT	
				CONNECTOR			
				CN402 *	1-564-506-11	PLUG, CONNECTOR 3P	
				CN450	1-573-301-21	CONNECTOR, BOARD TO BOARD 20P	
				CN451 *	1-564-505-11	PLUG, CONNECTOR 2P	
				IC			
				IC404	8-759-658-01	IC NJW1130G-TE2	
				CHIP CONDUCTOR			
				JR403	1-216-295-11	SHORT	
				JR404	1-216-295-11	SHORT	

Note:

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
JR407	1-216-295-11	SHORT		MA * A-1304-200-A MA (VAR) MOUNTED PC BOARD CAPACITOR C0031-126-959-11ELECT0.47μF20%50V C0061-126-964-11ELECT10μF20%50V C0091-163-259-91CERAMIC CHIP220PF5%50V C0101-163-035-00CERAMIC CHIP0.047μF50V C0111-163-259-91CERAMIC CHIP220PF5%50V C0121-163-009-11CERAMIC CHIP0.001μF10%50V C0151-163-231-11CERAMIC CHIP15PF5%50V C0161-163-231-11CERAMIC CHIP15PF5%50V C0171-126-960-11ELECT1μF20%50V C0191-163-259-91CERAMIC CHIP220PF5%50V C0201-163-038-11CERAMIC CHIP0.1μF25V C0211-163-259-91CERAMIC CHIP220PF5%50V C0221-163-135-00CERAMIC CHIP560PF5%50V C0271-163-009-11CERAMIC CHIP0.001μF10%50V C0281-163-259-91CERAMIC CHIP220PF5%50V C0321-164-004-11CERAMIC CHIP0.1μF10%25V C0331-163-259-91CERAMIC CHIP220PF5%50V C0341-163-037-11CERAMIC CHIP0.022μF10%50V C0371-164-161-11CERAMIC CHIP0.0022μF10%50V C0381-126-941-11ELECT470μF20%25V C0391-126-964-11ELECT10μF20%50V C0401-163-229-11CERAMIC CHIP12PF5%50V C0411-163-237-11CERAMIC CHIP27PF5%50V C0421-163-259-91CERAMIC CHIP220PF5%50V C0431-163-009-11CERAMIC CHIP0.001μF10%50V C0441-163-009-11CERAMIC CHIP0.001μF10%50V C0451-164-161-11CERAMIC CHIP0.0022μF10%50V C0461-104-664-11ELECT47μF20%25V C0471-163-259-91CERAMIC CHIP220PF5%50V C0481-163-259-91CERAMIC CHIP220PF5%50V C0511-126-941-11ELECT470μF20%25V C0601-163-005-11CERAMIC CHIP470PF10%50V C0621-126-959-11ELECT0.47μF20%50V C0631-137-194-81FILM0.47μF5%50V C0641-163-017-00CERAMIC CHIP0.0047μF10%50V C0701-163-009-11CERAMIC CHIP0.001μF10%50V C0711-163-009-11CERAMIC CHIP0.001μF10%50V C0761-163-259-91CERAMIC CHIP220PF5%50V C0771-163-259-91CERAMIC CHIP220PF5%50V C0911-163-037-11CERAMIC CHIP0.022μF10%50V C0931-163-259-91CERAMIC CHIP220PF5%50V			
JR408	1-216-295-11	SHORT					
JR420	1-216-295-11	SHORT					
JR421	1-216-295-11	SHORT					
JR422	1-216-295-11	SHORT					
JR425	1-216-295-11	SHORT					
JR426	1-216-295-11	SHORT					
JR427	1-216-295-11	SHORT					
JR428	1-216-295-11	SHORT					
JR429	1-216-295-11	SHORT					
JR474	1-216-295-11	SHORT					
JR491	1-216-295-11	SHORT					
<u>COIL</u>							
L410	1-414-271-11	INDUCTOR	47μH				
<u>TRANSISTOR</u>							
Q430	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX					
Q431	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX					
Q432	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX					
Q433	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX					
<u>RESISTOR</u>							
R403	1-216-295-11	SHORT					
R404	1-216-025-11	RES-CHIP	1005%1/10W				
R405	1-216-025-11	RES-CHIP	1005%1/10W				
R407	1-216-025-11	RES-CHIP	1005%1/10W				
R408	1-216-025-11	RES-CHIP	1005%1/10W				
R409	1-216-025-11	RES-CHIP	1005%1/10W				
R410	1-216-025-11	RES-CHIP	1005%1/10W				
R431	1-216-073-00	RES-CHIP	10K5%1/10W				
R432	1-216-073-00	RES-CHIP	10K5%1/10W				
R433	1-216-295-11	SHORT					
R434	1-216-065-91	RES-CHIP	4.7K5%1/10W				
R435	1-216-033-00	RES-CHIP	2205%1/10W				
R436	1-216-065-91	RES-CHIP	4.7K5%1/10W				
R437	1-216-033-00	RES-CHIP	2205%1/10W				
R438	1-216-033-00	RES-CHIP	2205%1/10W				
R442	1-216-033-00	RES-CHIP	2205%1/10W				
R443	1-216-105-91	RES-CHIP	220K5%1/10W				
R444	1-216-105-91	RES-CHIP	220K5%1/10W				
R445	1-216-105-91	RES-CHIP	220K5%1/10W				
R446	1-216-105-91	RES-CHIP	220K5%1/10W				
R455	1-216-081-00	RES-CHIP	22K5%1/10W				
R456	1-216-081-00	RES-CHIP	22K5%1/10W				
R468	1-216-295-11	SHORT					
R469	1-216-295-11	SHORT					
R470	1-216-025-11	RES-CHIP	1005%1/10W				

MA

Note:

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la securite. Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION	REMARK			REF.NO.	PART NO.	DESCRIPTION	REMARK		
C097	1-163-009-11	CERAMIC CHIP	0.001 μ F	10%	50V	C362	1-104-664-11	ELECT	47 μ F	20%	25V
C099	1-126-960-11	ELECT	1 μ F	20%	50V	C363	1-163-038-11	CERAMIC CHIP	0.1 μ F		25V
C302	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	C364	1-164-004-11	CERAMIC CHIP	0.1 μ F	10%	25V
C303	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	C365	1-137-194-81	FILM	0.47 μ F	5%	50V
C304	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V						
C305	1-126-933-11	ELECT	100 μ F	20%	16V	C366	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V
C307	1-163-227-11	CERAMIC CHIP	10PF	0.50PF	50V	C367	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C308	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	C368	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V
C309	1-126-933-11	ELECT	100 μ F	20%	16V	C369	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V
C311	1-163-123-00	CERAMIC CHIP	180PF	5%	50V	C370	1-126-933-11	ELECT	100 μ F	20%	16V
C313	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	C371	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C314	1-163-231-11	CERAMIC CHIP	15PF	5%	50V	C377	1-126-963-11	ELECT	4.7 μ F	20%	50V
C315	1-104-664-11	ELECT	47 μ F	20%	25V	C380	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V
C316	1-163-243-11	CERAMIC CHIP	47PF	5%	50V	C381	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V
C317	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	C382	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V
C318	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V						
C319	1-126-767-11	ELECT	1000 μ F	20%	16V	C389	1-115-185-11	CERAMIC CHIP	0.033 μ F	10%	50V
C320	1-164-005-11	CERAMIC CHIP	0.47 μ F		25V	C390	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C321	1-164-005-11	CERAMIC CHIP	0.47 μ F		25V	C391	1-126-933-11	ELECT	100 μ F	20%	16V
C322	1-164-005-11	CERAMIC CHIP	0.47 μ F		25V	C395	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V
C323	1-164-004-11	CERAMIC CHIP	0.1 μ F	10%	25V	C396	1-164-004-11	CERAMIC CHIP	0.1 μ F	10%	25V
C324	1-163-231-11	CERAMIC CHIP	15PF	5%	50V	C397	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V
C325	1-164-005-11	CERAMIC CHIP	0.47 μ F		25V	C398	1-126-964-11	ELECT	10 μ F	20%	50V
C326	1-164-004-11	CERAMIC CHIP	0.1 μ F	10%	25V						
C328	1-164-004-11	CERAMIC CHIP	0.1 μ F	10%	25V	CONNECTOR					
C329	1-164-004-11	CERAMIC CHIP	0.1 μ F	10%	25V	CN001 *	1-564-511-11	PLUG, CONNECTOR 8P			
C330	1-126-960-11	ELECT	1 μ F	20%	50V	CN002 *	1-560-124-00	PLUG, CONNECTOR (2.5MM) 4P			
C331	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	CN003 *	1-564-512-11	PLUG, CONNECTOR 9P			
C332	1-163-010-11	CERAMIC CHIP	0.0012 μ F	10%	50V	CN004 *	1-564-512-11	PLUG, CONNECTOR 9P			
C334	1-163-003-11	CERAMIC CHIP	330PF	10%	50V	CN005 *	1-764-333-11	PLUG, CONNECTOR 10P			
C335	1-126-963-11	ELECT	4.7 μ F	20%	50V	CN006 *	1-764-333-11	PLUG, CONNECTOR 10P			
C336	1-104-664-11	ELECT	47 μ F	20%	25V	CN302 *	1-564-507-11	PLUG, CONNECTOR 4P			
C338	1-164-004-11	CERAMIC CHIP	0.1 μ F	10%	25V	CN309 *	1-564-506-11	PLUG, CONNECTOR 3P			
C339	1-126-960-11	ELECT	1 μ F	20%	50V						
C340	1-126-933-11	ELECT	100 μ F	20%	16V	DIODE					
C341	1-163-233-11	CERAMIC CHIP	18PF	5%	50V	D001 $\triangle$	8-719-069-54	DIODE UDZS-TE17-5.1B			
C348	1-164-005-11	CERAMIC CHIP	0.47 μ F		25V	D002	8-719-110-17	DIODE MTZJ-T-77-10B			
C350	1-126-959-11	ELECT	0.47 μ F	20%	50V	D003	8-719-073-01	DIODE MA111-TX			
C351	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	D004	8-719-069-54	DIODE UDZS-TE17-5.1B			
C352	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	D005	8-719-109-89	DIODE MTZJ-T-77-5.6C			
C353	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	D006	8-719-069-60	DIODE UDZS-TE17-9.1B			
C354	1-126-933-11	ELECT	100 μ F	20%	16V	D075	8-719-073-01	DIODE MA111-TX			
C355	1-163-021-91	CERAMIC CHIP	0.01 μ F	10%	50V	D301	8-719-921-44	DIODE MTZJ-T-77-5.1C			
C356	1-164-004-11	CERAMIC CHIP	0.1 μ F	10%	25V	D305	8-719-921-44	DIODE MTZJ-T-77-5.1C			
C357	1-104-664-11	ELECT	47 μ F	20%	25V	D360	8-719-914-44	DIODE DAP202K-T-146			
C358	1-104-664-11	ELECT	47 μ F	20%	25V						
C359	1-163-038-11	CERAMIC CHIP	0.1 μ F		25V	FERRITE BEAD					
C360	1-126-959-11	ELECT	0.47 μ F	20%	50V	FB001	1-414-234-22	INDUCTOR CHIP	0 μ H		
C361	1-163-038-11	CERAMIC CHIP	0.1 μ F		25V	FB002	1-414-234-22	INDUCTOR CHIP	0 μ H		
						FB301	1-412-911-11	FERRITE	0 μ H		

**Note:**

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
<u>FILTER</u>				L308	1-414-273-11	INDUCTOR	100 μ H
FL301	1-239-847-11	FILTER, LOW PASS		L310	1-414-273-11	INDUCTOR	100 μ H
FL302	1-239-847-11	FILTER, LOW PASS		L350	1-414-856-11	INDUCTOR	10 μ H
FL303	1-239-847-11	FILTER, LOW PASS		L351	1-414-856-11	INDUCTOR	10 μ H
<u>IC</u>				<u>TRANSISTOR</u>			
IC001	8-759-688-47	IC M37280MK-112SP		Q001	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
IC002	8-759-663-29	IC MM1476AF(TP)		Q002	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
IC003	8-759-527-77	IC M24C16-MN6T		Q003	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
IC301 $\triangle$	8-752-094-98	IC CXA2154S		Q004	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
IC302	8-759-655-75	IC TC90A49P		Q006	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
<u>CHIP CONDUCTOR</u>				Q082	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR001	1-216-295-11	SHORT		Q302	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR002	1-216-295-11	SHORT		Q303	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR003	1-216-295-11	SHORT		Q305	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR005	1-216-295-11	SHORT		Q310	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR006	1-216-295-11	SHORT		Q349	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR007	1-216-295-11	SHORT		Q350	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR008	1-216-295-11	SHORT		Q351	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR010	1-216-295-11	SHORT		Q352	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR011	1-216-295-11	SHORT		Q354	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR090	1-216-295-11	SHORT		Q355	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR100	1-216-295-11	SHORT		Q356	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR101	1-216-295-11	SHORT		Q358	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR296	1-216-295-11	SHORT		Q359	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR297	1-216-295-11	SHORT		Q365	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR298	1-216-295-11	SHORT		Q368	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR355	1-216-295-11	SHORT		Q369	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR378	1-216-295-11	SHORT		Q370	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR379	1-216-295-11	SHORT		Q375	8-729-422-27	TRANSISTOR 2SD601A-QRS-TX	
JR391	1-216-295-11	SHORT		Q387	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR399	1-216-295-11	SHORT		Q388	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR401	1-216-295-11	SHORT		Q389	8-729-216-22	TRANSISTOR 2SB709A-QRS-TX	
JR402	1-216-295-11	SHORT		<u>RESISTOR</u>			
JR501	1-216-295-11	SHORT		R001	1-216-043-91	RES-CHIP	560 5% 1/10W
JR502	1-216-295-11	SHORT		R002	1-216-041-00	RES-CHIP	470 5% 1/10W
JR503	1-216-295-11	SHORT		R003	1-247-807-31	CARBON	100 5% 1/4W
<u>COIL</u>				R004	1-216-061-00	RES-CHIP	3.3K 5% 1/10W
L002	1-414-273-11	INDUCTOR	100 μ H	R005	1-216-295-11	SHORT	
L003	1-414-273-11	INDUCTOR	100 μ H	R006	1-216-025-11	RES-CHIP	100 5% 1/10W
L040	1-408-963-11	INDUCTOR	2.7 μ H	R007	1-216-025-11	RES-CHIP	100 5% 1/10W
L301	1-414-267-11	INDUCTOR	10 μ H	R008	1-216-049-11	RES-CHIP	1K 5% 1/10W
L302	1-414-271-11	INDUCTOR	47 μ H	R009	1-216-121-11	RES-CHIP	1M 5% 1/10W
L303	1-414-856-11	INDUCTOR	10 μ H	R010	1-216-033-00	RES-CHIP	220 5% 1/10W
L304	1-414-856-11	INDUCTOR	10 μ H	R011	1-216-033-00	RES-CHIP	220 5% 1/10W
L305	1-414-267-11	INDUCTOR	10 μ H	R012	1-216-045-00	RES-CHIP	680 5% 1/10W
				R013	1-249-417-11	CARBON	1K 5% 1/4W
				R014	1-216-073-00	RES-CHIP	10K 5% 1/10W

MA

Note:

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

REF.NO.	PART NO.	DESCRIPTION	REMARK			REF.NO.	PART NO.	DESCRIPTION	REMARK		
R015	1-216-073-00	RES-CHIP	10K	5%	1/10W	R086	1-216-045-00	RES-CHIP	680	5%	1/10W
R016	1-216-041-00	RES-CHIP	470	5%	1/10W	R087	1-216-045-00	RES-CHIP	680	5%	1/10W
R017	1-208-798-11	METAL CHIP	4.7K	0.50%	1/10W	R088	1-216-045-00	RES-CHIP	680	5%	1/10W
R018	1-249-409-11	CARBON	220	5%	1/4W	R091	1-216-073-00	RES-CHIP	10K	5%	1/10W
R019	1-216-113-00	RES-CHIP	470K	5%	1/10W	R092	1-208-798-11	METAL CHIP	4.7K	0.50%	1/10W
R020	1-216-033-00	RES-CHIP	220	5%	1/10W	R093	1-216-065-91	RES-CHIP	4.7K	5%	1/10W
R021	1-249-429-11	CARBON	10K	5%	1/4W	R094	1-216-065-91	RES-CHIP	4.7K	5%	1/10W
R022	1-249-409-11	CARBON	220	5%	1/4W	R095	1-216-065-91	RES-CHIP	4.7K	5%	1/10W
R023	1-249-429-11	CARBON	10K	5%	1/4W	R097	1-249-414-11	CARBON	560	5%	1/4W
R024	1-249-409-11	CARBON	220	5%	1/4W	R099	1-216-089-11	RES-CHIP	47K	5%	1/10W
R025	1-249-426-11	CARBON	5.6K	5%	1/4W	R251	1-216-065-91	RES-CHIP	4.7K	5%	1/10W
R026	1-249-426-11	CARBON	5.6K	5%	1/4W	R253	1-216-049-11	RES-CHIP	1K	5%	1/10W
R027	1-249-426-11	CARBON	5.6K	5%	1/4W	R256	1-216-073-00	RES-CHIP	10K	5%	1/10W
R028	1-216-049-11	RES-CHIP	1K	5%	1/10W	R257	1-216-049-11	RES-CHIP	1K	5%	1/10W
R029	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R258	1-216-065-91	RES-CHIP	4.7K	5%	1/10W
R030	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R259	1-249-429-11	CARBON	10K	5%	1/4W
R031	1-216-355-11	METAL OXIDE	3.3	5%	1W	R260	1-249-409-11	CARBON	220	5%	1/4W
R032	1-216-033-00	RES-CHIP	220	5%	1/10W	R261	1-216-113-00	RES-CHIP	470K	5%	1/10W
R033	1-216-033-00	RES-CHIP	220	5%	1/10W	R262	1-247-807-31	CARBON	100	5%	1/4W
R034	1-216-033-00	RES-CHIP	220	5%	1/10W	R263	1-216-025-11	RES-CHIP	100	5%	1/10W
R035	1-216-033-00	RES-CHIP	220	5%	1/10W	R267	1-216-049-11	RES-CHIP	1K	5%	1/10W
R036	1-216-049-11	RES-CHIP	1K	5%	1/10W	R268	1-216-045-00	RES-CHIP	680	5%	1/10W
R037	1-249-409-11	CARBON	220	5%	1/4W	R269	1-216-049-11	RES-CHIP	1K	5%	1/10W
R038	1-216-049-11	RES-CHIP	1K	5%	1/10W	R273	1-216-073-00	RES-CHIP	10K	5%	1/10W
R039	1-216-045-00	RES-CHIP	680	5%	1/10W	R274	1-216-295-11	SHORT			
R040	1-249-409-11	CARBON	220	5%	1/4W	R275	1-216-081-00	RES-CHIP	22K	5%	1/10W
R041	1-216-045-00	RES-CHIP	680	5%	1/10W	R276	1-216-085-00	RES-CHIP	33K	5%	1/10W
R042	1-216-071-00	RES-CHIP	8.2K	5%	1/10W	R277	1-216-129-00	RES-CHIP	2.2M	5%	1/10W
R043	1-249-417-11	CARBON	1K	5%	1/4W	R280	1-216-069-00	RES-CHIP	6.8K	5%	1/10W
R044	1-216-033-00	RES-CHIP	220	5%	1/10W	R281	1-208-798-11	METAL CHIP	4.7K	0.50%	1/10W
R045	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R282	1-208-790-11	METAL CHIP	2.2K	0.50%	1/10W
R046	1-216-033-00	RES-CHIP	220	5%	1/10W	R283	1-216-689-11	RES-CHIP	39K	5%	1/10W
R047	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R300	1-216-295-11	SHORT			
R050	1-216-033-00	RES-CHIP	220	5%	1/10W	R301	1-216-022-00	RES-CHIP	75	5%	1/10W
R051	1-216-033-00	RES-CHIP	220	5%	1/10W	R303	1-216-073-00	RES-CHIP	10K	5%	1/10W
R052	1-249-417-11	CARBON	1K	5%	1/4W	R304	1-247-807-31	CARBON	100	5%	1/4W
R054	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R305	1-216-295-11	SHORT			
R055	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R306	1-216-025-11	RES-CHIP	100	5%	1/10W
R056	1-208-798-11	METAL CHIP	4.7K	0.50%	1/10W	R308	1-216-022-00	RES-CHIP	75	5%	1/10W
R057	1-216-097-11	RES-CHIP	100K	5%	1/10W	R310	1-249-417-11	CARBON	1K	5%	1/4W
R058	1-216-097-11	RES-CHIP	100K	5%	1/10W	R311	1-216-025-11	RES-CHIP	100	5%	1/10W
R060	1-249-409-11	CARBON	220	5%	1/4W	R312	1-249-417-11	CARBON	1K	5%	1/4W
R061	1-216-033-00	RES-CHIP	220	5%	1/10W	R313	1-216-049-11	RES-CHIP	1K	5%	1/10W
R064	1-216-295-11	SHORT				R316	1-216-067-00	RES-CHIP	5.6K	5%	1/10W
R070	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R317	1-247-807-31	CARBON	100	5%	1/4W
R071	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R318	1-216-091-00	RES-CHIP	56K	5%	1/10W
R073	1-249-425-11	CARBON	4.7K	5%	1/4W	R319	1-216-081-00	RES-CHIP	22K	5%	1/10W
R074	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R320	1-216-025-11	RES-CHIP	100	5%	1/10W
R077	1-216-097-11	RES-CHIP	100K	5%	1/10W	R321	1-216-043-91	RES-CHIP	560	5%	1/10W

Note:

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



REF.NO.	PART NO.	DESCRIPTION	REMARK			REF.NO.	PART NO.	DESCRIPTION	REMARK		
R322	1-216-025-11	RES-CHIP	100	5%	1/10W	R376	1-216-022-00	RES-CHIP	75	5%	1/10W
R323	1-216-025-11	RES-CHIP	100	5%	1/10W	R377	1-216-057-00	RES-CHIP	2.2K	5%	1/10W
R324	1-216-065-91	RES-CHIP	4.7K	5%	1/10W	R378	1-216-295-11	SHORT			
R326	1-208-806-11	METAL CHIP	10K	0.50%	1/10W	R379	1-216-049-11	RES-CHIP	1K	5%	1/10W
R327	1-216-025-11	RES-CHIP	100	5%	1/10W	R382	1-216-295-11	SHORT			
R328	1-216-025-11	RES-CHIP	100	5%	1/10W	R383	1-216-295-11	SHORT			
R329	1-216-025-11	RES-CHIP	100	5%	1/10W	R384	1-216-295-11	SHORT			
R331	1-216-049-11	RES-CHIP	1K	5%	1/10W	R386	1-216-047-91	RES-CHIP	820	5%	1/10W
R332	1-216-022-00	RES-CHIP	75	5%	1/10W	R387	1-216-025-11	RES-CHIP	100	5%	1/10W
R333	1-216-067-00	RES-CHIP	5.6K	5%	1/10W	R388	1-216-025-11	RES-CHIP	100	5%	1/10W
R334	1-216-025-11	RES-CHIP	100	5%	1/10W	R389	1-216-049-11	RES-CHIP	1K	5%	1/10W
R335	1-216-057-00	RES-CHIP	2.2K	5%	1/10W	R392	1-216-067-00	RES-CHIP	5.6K	5%	1/10W
R336	1-216-057-00	RES-CHIP	2.2K	5%	1/10W	R394	1-216-043-91	RES-CHIP	560	5%	1/10W
R337	1-216-057-00	RES-CHIP	2.2K	5%	1/10W	R395	1-216-043-91	RES-CHIP	560	5%	1/10W
R338	1-216-073-00	RES-CHIP	10K	5%	1/10W	R396	1-247-807-31	CARBON	100	5%	1/4W
R339	1-216-091-00	RES-CHIP	56K	5%	1/10W	R398	1-216-091-00	RES-CHIP	56K	5%	1/10W
R340	1-216-025-11	RES-CHIP	100	5%	1/10W	R399	1-216-109-00	RES-CHIP	330K	5%	1/10W
R341	1-216-089-11	RES-CHIP	47K	5%	1/10W						
R342	1-216-049-11	RES-CHIP	1K	5%	1/10W						
R343	1-216-097-11	RES-CHIP	100K	5%	1/10W						
R344	1-216-295-11	SHORT									
R345	1-216-097-11	RES-CHIP	100K	5%	1/10W						
R346	1-216-097-11	RES-CHIP	100K	5%	1/10W						
R347	1-216-025-11	RES-CHIP	100	5%	1/10W						
R349	1-216-025-11	RES-CHIP	100	5%	1/10W						
R351	1-216-041-00	RES-CHIP	470	5%	1/10W						
R352	1-247-807-31	CARBON	100	5%	1/4W						
R353	1-247-807-31	CARBON	100	5%	1/4W						
R354	1-216-025-11	RES-CHIP	100	5%	1/10W						
R355	1-216-053-00	RES-CHIP	1.5K	5%	1/10W						
R356	1-216-025-11	RES-CHIP	100	5%	1/10W						
R357	1-216-022-00	RES-CHIP	75	5%	1/10W						
R358	1-216-093-91	RES-CHIP	68K	5%	1/10W						
R359	1-216-057-00	RES-CHIP	2.2K	5%	1/10W						
R360	1-216-093-91	RES-CHIP	68K	5%	1/10W						
R361	1-216-022-00	RES-CHIP	75	5%	1/10W						
R362	1-216-035-00	RES-CHIP	270	5%	1/10W						
R363	1-216-039-00	RES-CHIP	390	5%	1/10W						
R364	1-216-025-11	RES-CHIP	100	5%	1/10W						
R365	1-216-025-11	RES-CHIP	100	5%	1/10W						
R366	1-216-053-00	RES-CHIP	1.5K	5%	1/10W						
R367	1-216-057-00	RES-CHIP	2.2K	5%	1/10W						
R368	1-216-043-91	RES-CHIP	560	5%	1/10W						
R369	1-216-033-00	RES-CHIP	220	5%	1/10W						
R370	1-249-429-11	CARBON	10K	5%	1/4W						
R372	1-216-039-00	RES-CHIP	390	5%	1/10W						
R373	1-216-025-11	RES-CHIP	100	5%	1/10W						
R374	1-216-025-11	RES-CHIP	100	5%	1/10W						
R375	1-216-053-00	RES-CHIP	1.5K	5%	1/10W						

CRYSTAL

X001	1-767-487-11	VIBRATOR, CRYSTAL
X301	1-567-505-11	OSCILLATOR, CRYSTAL



* A-1342-550-A	VA (VAR) MOUNTED PC BOARD
4-382-854-11	SCREW (M3X10), P, SW (+)

CAPACITOR

C805	1-129-763-61	FILM	0.033μF	5%	200V
C811	1-129-765-00	FILM	0.047μF	5%	200V
C901	1-107-667-11	ELECT	2.2μF	20%	160V
C902	1-130-491-00	MYLAR	0.047μF	5%	50V
C903	1-126-925-11	ELECT	470μF	20%	10V
C904	1-130-471-00	MYLAR	0.001μF	5%	50V
C905	1-106-383-00	MYLAR	0.047μF	10%	200V
C906	1-130-471-00	MYLAR	0.001μF	5%	50V
C907	1-107-638-11	ELECT	33μF	20%	160V
C908	1-126-925-11	ELECT	470μF	20%	10V
C909	1-161-830-00	CERAMIC	0.0047μF		500V
C910	1-104-999-11	MYLAR	0.1μF	10%	200V
C911	1-104-665-11	ELECT	100μF	20%	10V
C912	1-126-941-11	ELECT	470μF	20%	25V
C913	1-102-074-00	CERAMIC	0.001μF	10%	50V
C914	1-130-491-00	MYLAR	0.047μF	5%	50V

**Note:**

The components identified by shading and mark $\triangle$ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par un trame et une marque $\triangle$ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
CONNECTOR				R915	1-249-417-11	CARBON	1K 5% 1/4W
CN901 *	1-564-508-11	PLUG, CONNECTOR 5P		R916	1-249-417-11	CARBON	1K 5% 1/4W
CN902 *	1-770-723-11	CONNECTOR, BOARD TO BOARD 8P		R917	1-249-417-11	CARBON	1K 5% 1/4W
CN904 *	1-564-507-11	PLUG, CONNECTOR 4P		R918	1-247-807-31	CARBON	100 5% 1/4W
DIODE				R919	1-247-807-31	CARBON	100 5% 1/4W
D804	8-719-302-43	DIODE RGP10GPKG23		R920	1-249-416-11	CARBON	820 5% 1/4W
D805	8-719-991-33	DIODE 1SS133T-77		R921	1-249-429-11	CARBON	10K 5% 1/4W
D806	8-719-991-33	DIODE 1SS133T-77		R922	1-249-397-11	CARBON	22 5% 1/4W
D807	8-719-210-21	DIODE ERA82-004TP5		R923	1-249-401-11	CARBON	47 5% 1/4W
D901	8-719-110-88	DIODE MTZJ-T-77-39					
D902	8-719-110-88	DIODE MTZJ-T-77-39					
D903	8-719-991-33	DIODE 1SS133T-77					
COIL							
L801	1-406-989-21	INDUCTOR	10mH				
L802	1-459-111-00	INDUCTOR	10mH				
L901	1-412-528-11	INDUCTOR	18μH				
TRANSISTOR							
Q807	8-729-931-45	TRANSISTOR IRF614					
Q808	8-729-140-97	TRANSISTOR 2SB734-T-34					
Q901	8-729-017-06	TRANSISTOR 2SC4793					
Q902	8-729-017-05	TRANSISTOR 2SA1837					
Q903	8-729-423-33	TRANSISTOR 2SC3311A-QRSTA					
Q904	8-729-423-33	TRANSISTOR 2SC3311A-QRSTA					
Q905	8-729-119-76	TRANSISTOR 2SA1309A-QRSTA					
Q906	8-729-423-33	TRANSISTOR 2SC3311A-QRSTA					
RESISTOR							
R818	1-216-025-11	RES-CHIP	100 5% 1/10W				
R826	1-249-421-11	CARBON	2.2K 5% 1/4W				
R876	1-216-049-11	RES-CHIP	1K 5% 1/10W				
R901	1-249-401-11	CARBON	47 5% 1/4W				
R902	1-249-386-11	CARBON	2.7 5% 1/4W				
R903	1-249-414-11	CARBON	560 5% 1/4W				
R904	1-249-432-11	CARBON	18K 5% 1/4W				
R905	1-249-417-11	CARBON	1K 5% 1/4W				
R906	1-249-432-11	CARBON	18K 5% 1/4W				
R907	1-249-386-11	CARBON	2.7 5% 1/4W				
R908	1-249-414-11	CARBON	560 5% 1/4W				
R909	1-260-312-11	CARBON	47 5% 1/2W				
R910	1-216-476-11	METAL OXIDE	180 5% 3W				
R911	1-249-403-11	CARBON	68 5% 1/4W				
R912	1-249-409-11	CARBON	220 5% 1/4W				
R913	1-249-403-11	CARBON	68 5% 1/4W				
R914	1-249-410-11	CARBON	270 5% 1/4W				

ACCESSORIES AND PACKAGING

- * 4-392-859-01 BAG, PROTECTION
- * 4-074-568-02 CARTON, INDIVIDUAL
- * 4-074-566-01 CUSHION ASSY, FRONT (UPPER)
- * 4-074-567-01 CUSHION ASSY, LOWER
- * 4-074-565-01 CUSHION ASSY, REAR (UPPER)
- 4-077-625-61 MANUAL, INSTRUCTION

REMOTE COMMANDER

- 1-475-069-21 REMOTE COMMANDER (RM-Y149A)
- 4-978-977-01 BATTERY COVER FOR RM-Y149A

CD-ROM CONTENTS

The enclosed CD-ROM contains the complete service manual, p/n 9-965-895-01, including adjustment specifications and electrical parts listing. All non-schematic pages of this file can be printed to a post-script printer from the CD on standard letter sized paper. The large paper schematics provided in this booklet are also accessible on this CD for your convenience.

Windows Users:

The enclosed CD-ROM has an auto-run feature which will launch automatically in Windows 95/98 or Windows NT operating systems only. Insert CD-ROM into player and wait for AdobeReader® to automatically launch. Depending upon on your operating system, it may take 15-20 seconds for the CD to activate.

Macintosh Users:

You must have the Macintosh version of AdobeReader® on your current system to view the PDF files on this CD. Acrobat Reader® can be downloaded free from the following website address: <http://www.adobe.com/products/acrobat/readermain.html>

